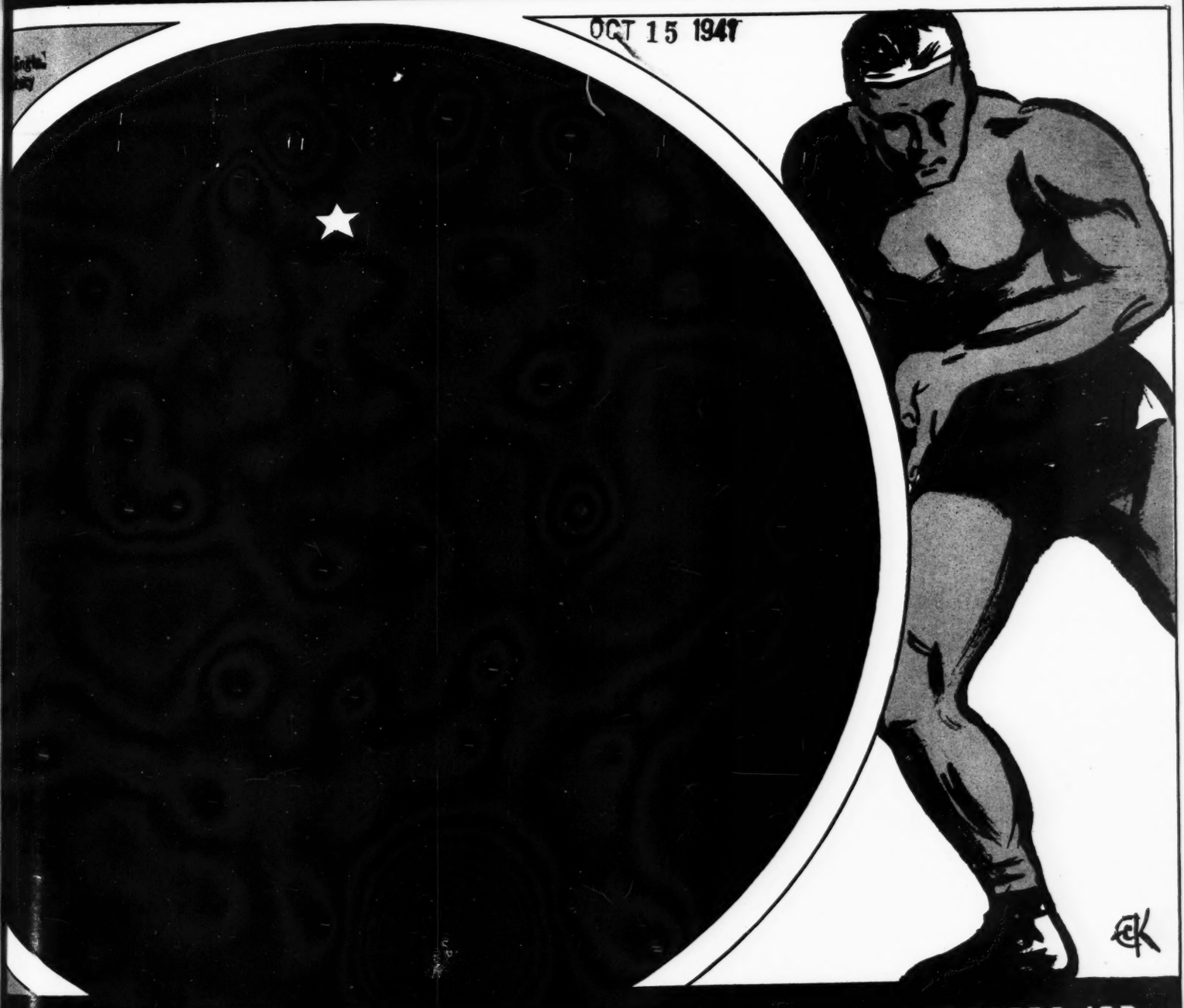
GAS

ENGINEERING • UTILIZATION • LOAD-BUILDING • MANAGEMENT

OCT 15 1941



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A MESSAGE TO THE GAS INDUSTRY

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Today we are confronted with another and different kind of problem - that of National Defense. This problem, too, must be solved by all of us, and to do our share we have pledged whatever of our facilities are necessary to help bring about its speedy success.

The public utilities have been recognized as a vital factor in National Defense. With your cooperation, priorities can be obtained which will enable you to continue to provide adequate service and enable us to continue to supply such equipment as you may need.

We are fortunate that the standing of the Gas Industry in the National Defense program will permit us to take care of all your necessary repair, maintenance and operating requirements.

Yours very truly,

W. F. Rockwell

W. F. Rockwell
President

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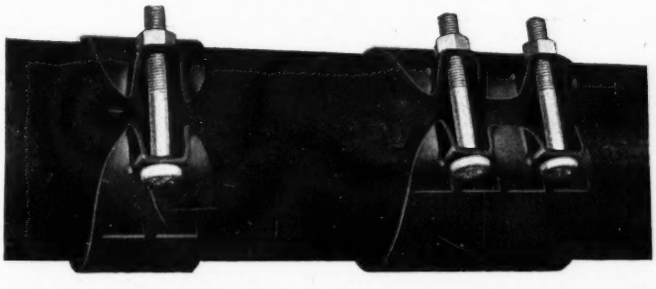

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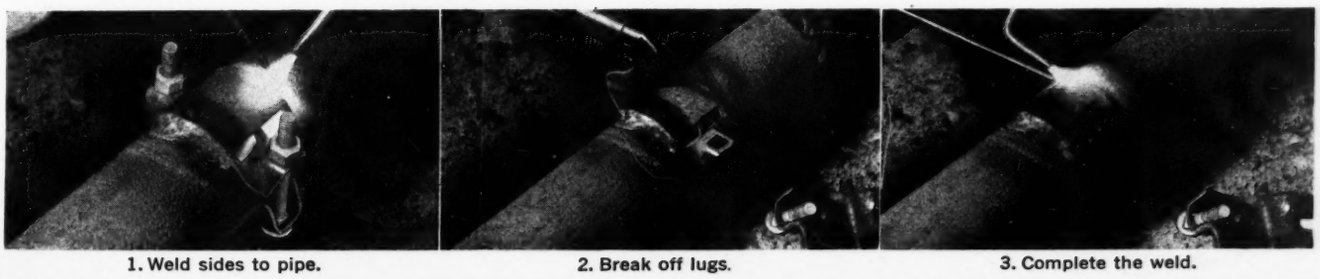

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GAS

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Seventeenth Year of Publication

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GAS
OCTOBER, 1941

GUEST Editorial

WE HAVE A JOB TO DO

By T. J. STRICKLER

President, American Gas Association

Vice President and General Manager, Kansas City Gas Co., Kansas City, Missouri

THE extraordinary times in which we are living prompts me to introduce a subject which should command our attention in this present hour of world history. One cannot serve the American Gas Association as president and travel the length and breadth of this country meeting thousands of men and women in our business without appreciating just how fortunate we are in being a united and cohesive industry.

It is a matter of established fact that the gas industry has continued to be united through both good times and bad, largely, if not entirely, because of the successful functioning of the American Gas Association. To be more specific and to place credit where credit is richly due, those who have served as members of the Association's Executive Board have been as influential as any other single group in this industry in keeping it united.

With this country fast facing all the conditions of war except actual war itself, it is more necessary than ever that we present a solid and united front as a vital American industry, utilizing to the fullest the facilities of the American Gas Association and continuing to support its program of activities.

It is becoming increasingly evident that the most pressing problems of the future will be of national proportions since we are involved in an international situation which calls for national action. Problems of this nature can best be dealt with through the American Gas Association, our national organization, and past experience tells us so in no uncertain terms. My advice, therefore, is to keep the ranks closed, maintain the formation, and stick together.

We have a job to do.

The fast occurring developments of the moment, some of them too bewildering to contemplate calmly, demand strong faith, good judgment, a healthy mental outlook, wise and courageous leadership, shrewd management, sound patriotism, and no letting up of hard work. They are the answers and the only answers to the terrific responsibilities of this fateful hour in history. They are also the weapons which have never yet failed to serve us well in former emergencies. Let us arm ourselves with such weapons, plus the implements of war, and we will then be prepared to meet any challenge.

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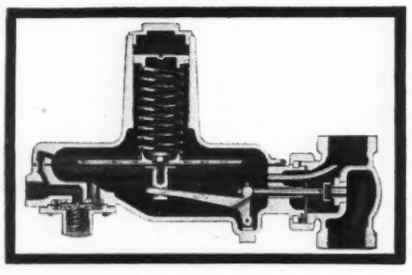
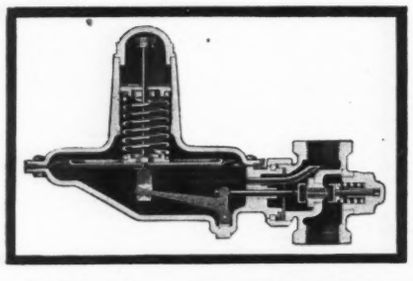


★ TYPE 733A — with built-in relief valve for protection against excessive reduced pressures.



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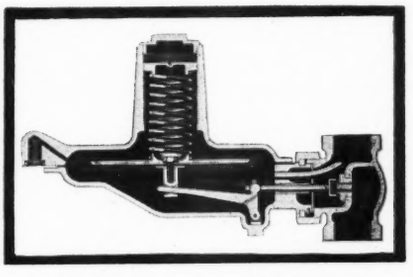

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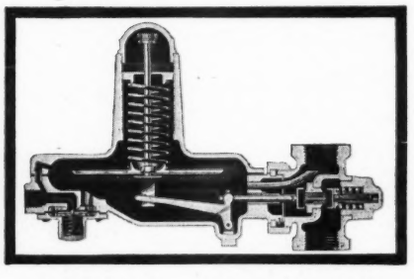

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THERMALLY *Thinking*

A Congressman Speaks Up

ON July 15, Jay Jenkins, publisher of *GAS*, sent to Congressman Leland M. Ford of the 16th District in California a telegram and editorial offering evidence that many small U. S. businesses, through enforcement of priorities, were faced with disruption if not oblivion due to the materials shortage.

Congressman Ford replied to Mr. Jenkins stating that the editorial together with remarks by Mr. Ford would be called to the attention of every congressman and inserted in the Congressional record. Mr. Ford's remarks from the Congressional Record, September 29, 1941, follow:

MR. LELAND M. FORD. Mr. Speaker, I wish to draw the attention of the House to an editorial in *GAS*, the Natural Gas Magazine. I think that every member of this house should read this editorial and read it with interest.

Briefly, in this one minute allotted to me, it does not seem reasonable that the manufacturers of gas equipment appliances in this country should be threatened with the necessity of closing their stores and forfeiting their business while the English are going ahead with their business of manufacturing, not only for themselves, but for their export business. It seems to me that this country might be destroying its own foreign trade, and while the English are hollering for help they are grabbing our business.

In addition to this, I have been told on the Pacific Coast, with reference to the matter of steel, that if the politicians, the Federal officials, and members of commissions would leave the steel companies alone and let them produce. they could produce every ounce of iron and steel that the Government needs in all its ramifications of defense, and could fill every order of their private business.

It is high time that some of this mismanagement ceases before our businesses are entirely wrecked. This may, however, come under the nationalization of business, which in the final result, will accomplish the purpose of changing this form of government over to one of socialism. Those of you who are not Socialists, Nazis, Fascists, or Communists certainly should pay attention to the things that are going on if you want to retain the American form of government under which we have such a thing known as private business.

(At this point Mr. Ford read before the House the editorial, "With Justice for All," published in *GAS*, August, page 11.)

In taking the stand shown by this editorial, *GAS* heartily endorses the policy of a continuous, intelligent, and industry-wide program to bring forcefully to the attention of the American people and their governmental authorities the essential service which the industry offers to 80,000,000 consumers.

In seeking the solutions to the many priorities problems, the efforts of industry leaders have not been in vain—not that these efforts should be mitigated! And the evidence now reveals that by January 1, 1942, the small manufacturer will be breathing easier, sleeping sounder. He may be hampered by restrictions, but he will not be faced with destruction.

A Call for Realism

AS a realistic appraisal of things to be done the advice given the members of the Association of Gas Appliance and Equipment Manufacturers by its counsel, George E. Frazer, transcends by far any of the comments or suggestions regarding industry defense coordination that it has been our privilege to hear.

The patriotism and the cooperative spirit that permeates the entire gas industry, from utilities to equipment manufacturers is beyond question and above reproach. We have never felt it incumbent on us to devote editorial space to whipping as a laggard horse the vital concern over our national welfare that is already being demonstrated by gas men and by appliance and equipment men alike.

Rather have we felt it our obligation to point out unremittingly that industry survival is a matter of vital concern to all of us, and to stress the fact that should be self-evident,—that only the gas industry can be expected to fight gas industry battles.

It is no secret that close to the inner sanctum of the present administration are many who would use the emergency as an opportunity to eliminate forever the gas industry as we know it. Private ownership of public utilities, once the stalking horse of a handful of unheeded radicals, is now the pet anathema of powerful presidential intimates.

We believe that there are many who, without the least show of compunction, would seize upon the slightest evidence of recalcitrance to brand the entire industry as non-cooperative, if not indeed antagonistic, to the aims of national defense. Once such a charge had been successfully levelled, and maintained under the principles of psychological terrorism that are now being employed by Washington, a long step toward the socialization of utilities would have been accomplished.

Yet, on the other hand, if the industry lies down in the path of the rolling juggernaut of bureaucracy pointed toward it, it will fare no better.

For this reason it is imperative that we make fine and clear to ourselves the distinction between national defense, the ostensible objective, and the complete undercover reorganization of our national economy which is being attempted as a parallel effort.

The friends of the gas industry are legion, and fortunately there still remains a handful of these friends even in Washington. But by and at large, the greatest source of strength of the industry is not in its political connections, not in its banking affiliations, nor its financial structure. The strength of this industry rather lies in the respect and confidence that it has earned as a purveyor of service to the factories and the homes of America, and in the inseverable link with human welfare that that service has forged.

Even the ardent proponents of the new order may be expected to hesitate long before they lay destructive hands on the organization of an industry whose functions are so vital to the American way of life. The problem posed, becomes twofold, one of maintaining and developing to an even higher degree of social usefulness the service that gas renders, and the other of keeping everlasting before all of the people the importance of that service in their daily lives as well as in their national welfare.

The five point program outlined before the gas appliance and equipment manufacturers becomes then not only a program for the manufacturing branch of the industry but for the utilities as well. These are the points that, in the opinion of Attorney Frazer with which we heartily concur, must be untiringly stressed in all of our public, political and private contacts, whenever the relation of gas to national defense is under consideration:

First: Out of our population of 130 million people, about 80 million are dependent on some form of gas

service for their domestic requirements. Even the slightest disruption of the maximum possible service through unnecessary curtailment of materials for supplies, appliances and equipment must therefore be avoided.

Second: The preparation and the preservation of the proper kind of food, without waste and to the limit of our ability to make such food available, must be safeguarded. This, and the adequate heating of the nation's homes, are essentials in the maintenance of civilian morale, without which no war can be waged successfully.

Third: Gas appliances conserve metals. For heat units delivered only about 60% of the amount of metal is required as compared to equipment burning solid fuels.

Fourth: Except for isolated and almost negligible instances, our fuel is not in shortage and will not be no matter how long the emergency may last. Tie-ups in coal deliveries, in fuel oil, in wood and even in electricity may be expected. Gas will always be available, as dependable in time of peril as in time of peace.

Fifth: A large proportion of the sendout is already going into essential defense activities, either in the manufacture of defense materials, or in supplying the necessary household fuel for civilians in defense areas.

It is true that the Washington offices of both the American Gas Association and the Association of Gas Appliance and Equipment Manufacturers are laboring day and night to perform special services for individual members of the two organizations. Much of this work has been highly successful, and many unnecessary hardships on companies and consumers have been avoided through the effective intervention of the industry's personal representatives.

But the obligation of a great industry to fight its own battles cannot be lightly shifted to the shoulders of a few professional warriors. Its voice must be an insistent and a unanimous declaration not only of its readiness to serve, but of its right to the equipment and facilities that make its service possible. Certainly the flood gates of publicity should be thrown open so that every employee of all utilities and manufacturers and every consumer who enjoys gas service may know of and talk about Mr. Frazer's five points.

Sordid though the note may sound, in the great symphony of self sacrifice that is now being played, it is none the less realistic to observe that those industries that have fared best have been the ones who have fought the hardest and shouted the loudest whenever and wherever their ability to produce has been threatened without demonstrated reason. Small business has been driven to the verge of extinction, not because its goods and services were not necessary to the national welfare, but because it has lacked a cogent plan and a convincing spokesman.

Belatedly the administration is recognizing that it cannot build the unified national will that the times require on the rubble and debris of small industrial casualties. Not solicitude for the survival of little business, but an appreciation of its potency as a factor in democratic society is responsible for this new attitude.

Alert and dedicated as we are to the welfare of the nation, let us not lose sight of the fact that our contribution to that welfare is not a marginal, not a non-essential, thing. Special interests are urging now, as they have urged in the past, that the progress of gas be stayed; that in the interests of national defense new fuel lines should not be built; that the delivery of service to new areas and to new consumers be held in abeyance. They would hamper the progress of the industry by choking off at the source the supplies that make its progress possible. These efforts must not succeed, yet only a united industry can keep them from succeeding.

War is a Machiavellian game, and in it naivete means death. It is for this industry to resolve that the central brassy note of the bugle shall not mask the whispered voice of the assassin, lest the very democracy we cherish die in our valiant attempts to save it.

Meeting the Test

NOT to be overlooked is the opportunity afforded the delegates to the annual meeting of the American Gas Association to stop off at Philadelphia on Thursday, the day after the convention in Atlantic City closes, for Industrial Gas Day at the National Metals Congress and Exposition in the municipal auditoriums of the Quaker city.

A visual demonstration of the equipment and the processes whereby gas is playing such an important part in the metals industry, and particularly with respect to metals going into materials for national defense should be at once stimulating and informative.

It is not by chance that the industrial gas departments of the various companies have been found 100% prepared to answer every demand that increased defense production has put on them. Over a period that stretches back to World War I, gas utilization engineers and the designers and manufacturers of furnaces and heat treating equipment have been working to perfect the apparatus that is now turning out production in ever increasing quantities.

The close of the first conflict found some sadly inefficient gas utilization furnaces left over in war industries establishments, and much of it instead of being an asset to the proponents of gas for heat treating, was something that was better ignored completely. In the past 20 years, and particularly in the past decade, however, the picture has completely changed. It is safe to say, that there is hardly a modern industrial gas installation to be found that cannot be used to demonstrate the superiority of gas over any other fuel.

Entirely new processes either completely unknown, or undeveloped in 1918 are now commonplace equipment in the manufacture of defense materials. Rotary hearth type shell nosing and shell forging furnaces have taken the place of the old stationary type, assuring greater speed in production and a more uniform output. Gas radiant tubes, but recently developed, are being used in the annealing of aluminum castings for airplane parts. Controlled atmosphere carburizing furnaces have cut the time on a process that once took days of heat treating to a matter of a few hours, with lower labor costs, lower fuel costs and a uniformity due to controlled conditions that practically eliminates rejects.

It is to the industrial research programs of the gas companies and the gas furnace manufacturers working in complete cooperation that the credit for many of these new developments must be given. And it is to these same factors and the engineers who carried them through that utility management may also give credit for the rise in industrial gas use to an all time high for the first eight months of the current 1941.

The equipment large and small, ranging from bench furnaces to large individually engineered furnaces and ovens for highly specialized processes, on display in Philadelphia are there primarily for the edification of the metals industries. They may well serve the dual purpose of education and inspiration to the gas men who visit the exhibition on Industrial Gas Day.

More Than 5000 Copies This Issue

THE INSTITUTE OF GAS TECHNOLOGY

1. The Work Begins

CLASSES at the Institute of Gas Technology are now under way. Fellowships for the first year have already been awarded to four selected graduate students who began their work at the Gas Institute on September 22, according to an announcement by H. T. Heald, president of the Illinois Institute of Technology, Chicago, Ill., which was selected last June as a result of an extensive survey by a gas industry committee to be the site of the newly founded Institute of Gas Technology. Dr. Harold Vagtborg, director of the Armour Research Foundation, is director of the Gas Institute and Dr. Lincoln R. Thiesmeyer, formerly of Lawrence College, Appleton, Wis., is student advisor. Other members of the teaching staff for the current year include the following:

Gas Chemistry: Associate Professor Robert C. Kintner, Professor Vasili I. Komarewsky.

Heat Transfer: Professor Max Jakob.

Catalysis: Professor Vasili I. Komarewsky.

Chemical Thermodynamics: Dr. Bruce Longtin.

Fluid Flow: Associate Professor Victor L. Streeter.

Advanced Mathematics: Assistant Professor John W. Calkin.

Geology: Associate Professor Lincoln R. Thiesmeyer.

English, Technical Writing: Assistant Professor Sanford B. Meech.

The four students to whom $1000 fellowships have been awarded for the first year, and who will pursue programs leading to masters and doctors degrees are Gerald J. Lubin, B.S., Chemical Engineering, University of Detroit; Alexander K. Mikulski, B. S., Chemical Engineering, Fenn College; Robert Moody Newhall, B. S., Chemical Engineering, Tufts College; and Henry E. Robison, B. S., Chemical Engineering and M. S., Physical Chemistry, Washington University.

While the beginning class is a small one, it is expected that a larger class, possibly 15 students, will be admitted next year. Several of the appointments for the first year have not yet been made, and there is a possibility that a few qualified men will be permitted to the program to begin in the second semester in February. Fellowship awards totalling $40,000 to 10 engineering school graduates are to be offered for 1941-42 by the Institute of Gas Technology at Illinois Institute of Technology, according to President Heald, *GAS*, Sept., 1941, pg. 40.)

The Institute of Gas Technology, a separate unit on the Armour College of Engineering campus of Illinois Tech, was created in June by a $1,000,000 appropriation of 17 leading gas companies of the United States. The financing of instruction, maintenance and related costs of the gas research project will proceed at the rate of at least $100,000 a year for the next 10 years.

Buildings necessary to house activities of the Institute of Gas Technology will be built eventually as part of a plan distinct from the existing $3,000,000 development program of Illinois Tech. The diagram shown above pictures the general layout prepared for the use of the Gas Institute on one floor of a new building at 33rd and Dearborn streets, in Chicago. The space is intended to be adequate for about 20 students.

Fundamental and applied research pointed to betterment of the gas industry will be the aim of fellows and faculty of the Institute of Gas Technology. Peak enrollment, to be reached gradually so that selective caution as to enrollee may be exercised, will be from 50 to 60 students.

Fellows remaining for the entire four year program envisioned by trustees of the Institute of Gas Technology will receive Ph. D.'s in subjects already part of the highly-developed graduate school of Illinois Tech. Summer vacation employment, at $125 per month, will be available to each fellow.

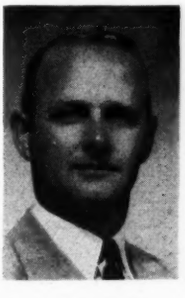
The course of study will include organic chemistry, engineering mathematics, physics, fluid flow and heat transfer, physical chemistry, gas technology, chemistry of polymerization and depolymerization, catalysis and surface chemistry. (See *GAS*, July, 1941, pg. 16.)

Also offered will be curricula including the equivalent of one year of academic work in the background of industrial gas problems, including operation, management and regulations of public utilities. Equipment and materials for manufacture, storage and distribution of gas, by-products of the industry, management problems, and related subjects will be studied.

In his fourth year a fellow will concern himself with research fundamentally of use to the gas industry. His summer employment period will be connected with some phase of gas technology.

Engineering graduates from schools other than engineering colleges are eligible for fellowships. From each $1000 grant $325 is deductible for tuition, fellows thus receiving $75 per month for nine months after tuition is paid. Application should be made

THE INSTITUTE OF GAS TECHNOLOGY last month became a reality. On September 22, four picked students attended the institute's opening classes, and the institute became a functioning organization. On other pages in this issue will be found remarks by two gas industry executives who in the past have played prominent roles in the conception and creation of the institute. On page 28, F. M. BANKS, vice president in charge of sales of the Southern California Gas Co., Los Angeles, discusses what the institute will do for the gas industry and clarifies the relationship between the institute and other technical and research activities of the American Gas Association. Mr. Banks, although now a sales executive, is a graduate engineer, Massachusetts Institute of Technology, 1922. In that same year he became affiliated with Southern California Gas Co.'s engineering department, and after a series of promotions, in 1934 was named to the board of directors and elected a vice president of the company.



F. M. BANKS

HERMAN RUSSELL

HERMAN RUSSELL, president of the Rochester (New York) Gas and Electric Corp., and a former president (1937) of the American Gas Association, on page 31 discusses the financing of the Gas Institute. Both Mr. Russell and Mr. Banks are members of the institute's board of trustees. The remarks herewith presented are excerpts from papers which were presented before the annual convention of the Pacific Coast Gas Association meeting in Del Monte, Calif., September 10-12, 1941.—Editor.

to the Institute of Gas Technology, 3300 Federal Street, Chicago, Ill.

Chairman of the board of trustees of the Institute of Gas Technology is Frank C. Smith, president of the Houston (Texas) Natural Gas Co. Members of the executive committee, in addition to Messrs. Heald and Smith, are: Herman Russell, president, Rochester Gas and Electric Corp., New York; F. H. Lerch, Jr., president, Gas Companies, Inc., New York; Frank H. Adams, vice president, Surface Combustion Corp., Toledo, Ohio; Thomas Drever, president, American Steel Foundries, Chicago and member of the Board of Trustees of Illinois Tech, and Wilfred Sykes, president of Inland Steel, Chicago and member of the Board of Trustees of Illinois Tech.

2. Purpose and Operation

By F. M. BANKS

Vice President, Southern California Gas Company, Los Angeles, Calif.

IT IS THE purpose of this report to present some of the reasons back of the plan for our industry to train students, and something about the sort of research work the Institute of Gas Technology may undertake. Equally important will be an indication of some of the limitations of the work it can encompass.

The objectives of the Institute are:

1. Training of men for the industry.
2. Fundamental and applied research.
3. Collection and dissemination of scientific information.
4. Encouragement of further research by others in the business.

This program is based on the following premises:

1. That an urgent need for research exists.
2. That coordination of existing research is important.
3. That an independent research agency such as this can best develop such research results as are of value to this industry.
4. That results of research must be correlated.
5. That research men, trained in gas research, can best assist to translate research results into functions of our business.

The Institute is a going organization, already beginning to function, with funds secured over a 10-year period, sufficient in amount, at this early date to guarantee a modest but enduring beginning. Let us look for a moment to the long term benefits of such a program. What of the students; what can they do?

Scientifically trained men can aid industry to translate research findings into the detailed processes of its own business. Of course, industry itself can train such men, although the process is often cumbersome, expensive, or at least unduly limited in scope, but such training is more properly the work of universities. Obviously, most universities must train on a basis broad enough to cover a wide variety of occupations, hence the men available to us have received only a general training, or have specialized in some field not directly akin to our business. Although some other businesses are fortunate enough to be able to employ men trained for their business by specific university courses, such is not true of our industry as a rule. We must recruit our research men, our research interpreters, from the general ranks of scientifically trained men. Our manufacturers, who need well-trained recruits for the adequate advance of their technique, are likewise dependent upon men not particularly trained in our affairs.

High Scholarship Standards

Now this Institute is going to hand pick graduate students from various scientific schools. They will be set to work—a very few a year—to earn masters or doctors degrees in a very special field. It is proposed that academic standards will be high; that the ratio of faculty to students shall be high; and that their work shall include research in subjects of interest to our business. All of this, under close faculty supervision, and with proper restrictions of elective study, is intended to produce men prepared in greater degree than has heretofore been possible to enter our industry.

The Board of Trustees has arranged recently to offer fellowships of $1000 yearly, for the four year period, to cover tuition and reasonable living expenses for the school term. Summer jobs for two months each year will be required and will be provided in the gas industry at a stated salary.

The course of study, which requires college graduation for admission, would include three years of academic training based upon the fundamental sciences and fundamental research. The fundamental science studies include organic chemistry; engineering mathematics; physics; fluid flow and heat transfer; physical chemistry; gas technology; chemistry of polymerization and depolymerization; and catalysis and surface chemistry. (GAS, July, 1941, page 16, 17.)

Can there be any denying that we shall profit by the infiltration of these men into our business? What industry executive has not wished for some such source for recruiting new blood into his organization? Here is industry furnishing the funds and having a voice in establishing the qualifications to be expected of a training program—an educational institution, training, supervising and conducting research. Certainly, here is team work and efficiency keyed to the exigencies of the present critical times.

This process is not an untried venture into the vast realm of research. It is not an idealistic dream. Instead, it is patterned after the Institute of Paper Chemistry, a cooperative move undertaken in 1930. That organization has proved itself during the past 10 years. Its director, Dr. Westbrooke Steele, has written, (GAS, November, 1940, page 23) ". . . it has justified its program, increased the scope of its activity, and made a substantial contribution to the transition of the paper industry from an art to a science."

If one is prone to question the extent to which our industry can be compared with the paper industry, let me pose this. A committee of competent gas industry men spent months considering the various means of getting research work done for our industry. They overlooked none of the methods available. They heard expert proponents of various methods. Out of it all has come this conclusion; this functioning organization. If one wonders why we trouble to train men, let me point again to our need. Until very recent years many of our manufacturers, just by way of example, have been completely without scientifically trained men, to assist in their design. Only the larger ones dared think of a research man or research expenditure.

Why must we be content to have to train our own men from the beginning; to make over budding electrical engineers, mechanical engineers or chemists? Those of us who are fortunate enough to have research staffs of our own and can expend funds on various problems, perhaps can afford to train our people as we wish. Even

so, there is evidence that we too would be well served to start with trained post graduates in Gas Research.

But when one thinks of the numerous situations, both utility and non-utility, where no research work can be undertaken as a regular program, one realizes they would be immeasurably assisted by having gas industry trained men. However, I do not wish to create the impression that specifically trained men are needed in utilization work alone. Our business has need of new processes, new applications, a more fundamental knowledge of many ramifications of its affairs.

Let me correct an impression that has gotten about, an impression that these great research problems are to be tackled by the students in the course of their training. Such is not the case in any major degree. The overall planning and supervision for research will be done by the Director and the faculty. The most important phases of the research itself will be done by the faculty members. The students will receive their research training by carrying out specific or fractional projects under that supervision. In other words, much of their work might be called "pot boiling."

There have been varied and often opposed statements as to what sort of research the Institute is going to do. The question has been raised whether the new program is going to interfere with the research work which has been going ahead under the A. G. A.

The wide variety of opinion about the nature of work to be undertaken comes from the fact that new evidence and new experience brought out by investigations of the committee have changed the ideas of many of us who have been interested in the plan. For example, there was at one time considerable thought that such an institute should devote itself solely to fundamental research, as its basic function. Applied research, if undertaken at all, was to be largely on a jobbing basis for members or for others, and was to be paid for by them, thus it defrays the organization's expense.

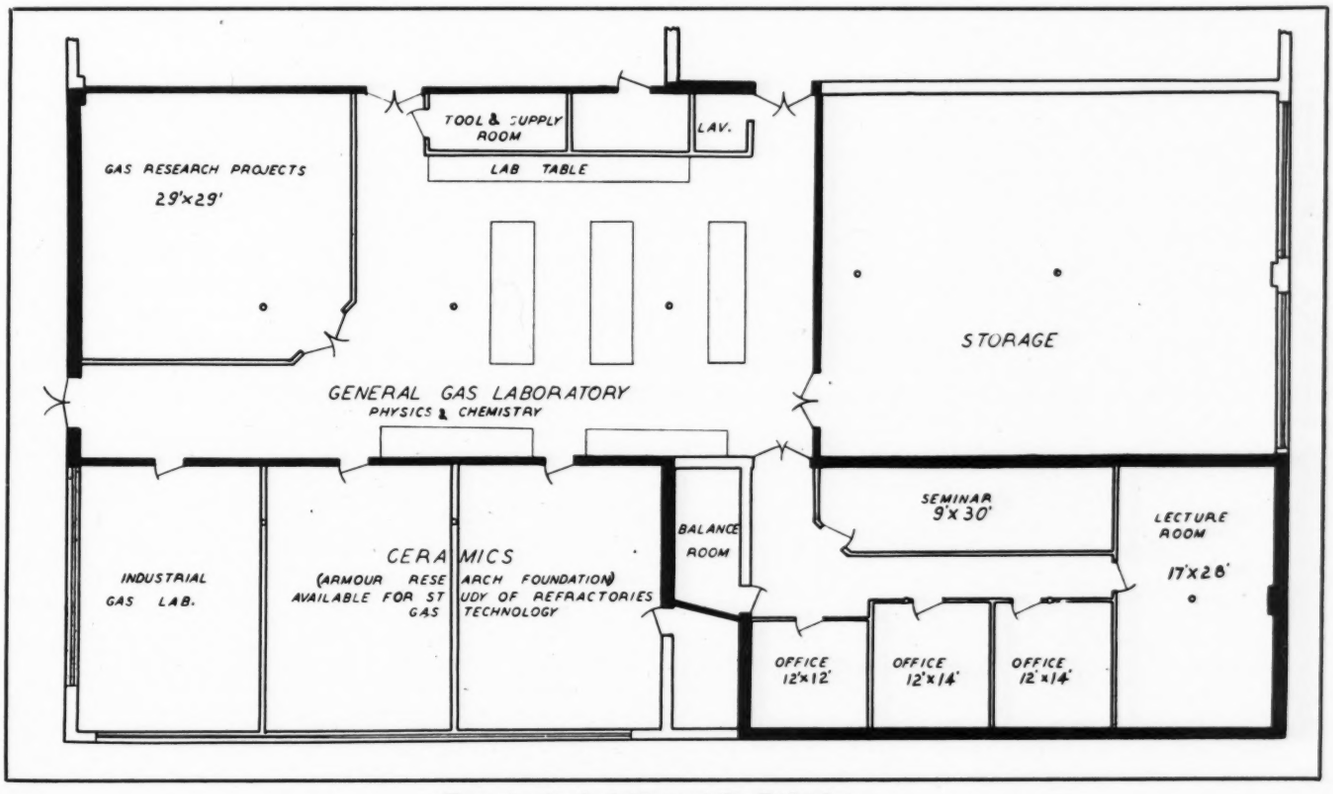
Objectives Defined

There is little wonder that some measure of confusion has resulted when one stops to define "fundamental" and "applied" research. We have been amazed to find as many definitions as there were men in the room; to recognize also that what one considered fundamental was not nearly fundamental enough to suit another; in other words, that there are gradations and blendings of "fundamental." You will observe that the student training and the Institute objectives encompass both applied and fundamental. We have stopped quibbling over words and are interested in research work important to our industry.

Fundamental research, if such can be satisfactorily defined, can cover an almost endless range of subjects and call into play an untold variety of special fields of research. It may deal with the most abstract of phenomena, or it may be very closely related to work at hand.

Those who have tried your hand at so called applied research, perhaps some developmental appliance research, will confirm the statement that almost at once your efforts led to some unknown in the field of gas utilization. Those "unknowns" called for fundamental research in some measure — or else you had to resort to empirical cut and try methods to bridge the gap because you had neither the time nor the equipment nor the men with which to tackle the fundamental research.

Some may fear that a research program will go too far afield; that we may be launching forth on a noble wild goose chase. Let me say that there is no real need for a program of sound research to be a wild goose chase. Even though some businesses have spent millions with little to show in the way of tangible results, we think a fortunate middle course can be steered. Research, to be "fundamental" need not be a glimmering will of the wisp. There are many problems about which little is really known, problems just off of the everyday path of our affairs. Let me give a specific example from the utilization field, not because that is necessarily the most important, but because it is a field



Floor plan for the Institute of Gas Technology

with which we are all more or less familiar. We have been in the heating business for a long time, and we think we know something about it. Yet, today there is practically nothing known about what is called "sun effect" as it concerns the business of heating homes. That subject calls for research before we can hope to do more than "cut and try" as has been done for years. And, by the way, if you should decide, as we have, to do some research work on that single problem, you would have no place to go to ascertain what, if any, work had been done on it by others. You would have to make a canvass of the most probable sources for doing research of that sort, and see what they had done in order to keep from duplicating their work.

In short, the Institute is designed as a permanent organization to conduct research in various fields, without the restriction of having to get dollar and cents results immediately, to keep going. At the same time, it must necessarily justify its existence on a reasonable basis, just as the Institute of Paper Chemistry has done, or its support is not going to be continued.

You will be interested to know that 40 utility companies are carrying on some research work of their own; that 17 others have been getting research done for them. The combined expenditure for such work has been on the order of $350,000 annually. To that must be added an unknown amount of research by manufacturers of equipment and appliances. All in all, the range of subjects covered is very wide, although probably the great majority of the work has properly been of the very practical sort, which I suppose one could have called "applied." Almost none of it has been correlated with any similar work elsewhere.

A. G. A. Research Program

The American Gas Association has carried out a program of research for years. Some may know something about it, but to many it comes as a surprise to hear that for the past 15 years the American Gas Association has budgeted between $50,000 and $60,000 yearly for research of one sort or another. Some of the work has been farmed out to industrial concerns or universities; some has been done at the Cleveland laboratory.

Requirements research is a necessary part of developing approval requirements for the appliance testing program. For example, several years ago when it became necessary to test insulation of range ovens, we had to have some standard to go by. That called for some so-called researches into the subject. Also, in considering tightness of furnace joints, the laboratory was asked to ascertain what should be acceptable tightness and what should not. Frequently such problems have called more for investigations than for research. At other times, research of a much more fundamental sort has been necessitated. It is my understanding that Requirements have taken from a third to a half of the American Gas Association budget on the average, but unfortunately there have been times when even that necessary work had to be put over to the next budget period because funds were not available in the general budget.

Progress in Cleveland

Although the Cleveland laboratory was not originally established for the purpose of carrying on research, it has done work of a more truly research nature than just requirements research. That research has been carried out for the Committees which have been ably headed for many years by F. J. Rutledge of Philadelphia. Because of this, the laboratory has come to be equipped and staffed to handle research especially in the fields of (1) Fuel Gases, (2) Combustion, and (3) Appliances, and other current utilization equipment. Some 4000 sq. ft. of space is available for varied research work, together with necessary office space, storage facilities, access to chemical laboratories and library facilities. R. B. Harper of Peoples Gas, Light and Coke Co., Chicago, who, until recently, had been head of the requirements activity of the American Gas Association for many years, says of the Cleveland laboratory and its personnel, "I think this establishment has been used largely for so-called researches in the field of developed appliances, etc. and utilization, because they had a good background and fine knowledge of appliances and utilization equipment such as does not generally exist anywhere else."

During the past 16 years they have issued 227 reports on problems relating to requirements. One hundred and ninety-two progress reports and bulletins have been prepared on research projects covering studies on mixed gas; pipe joints; mechanical couplings; comparative fuel efficiencies; industrial problems on preheating, burner noise, operating and wall temperatures of industrial furnaces, combustion space requirements, and production of reducing atmospheres; domestic appliance problems on fundamentals of appliance design; and a comprehensive study of atmospheric burner design. Several projects are actively being worked on at this time.

What is to be the relationship between the work of the new Institute and the Cleveland laboratory? Will the new organization duplicate the work of the older one; will it replace it? These are questions that should be answered and can be. In the first place, let me repeat that one of the objectives of the new Institute is to foster more research work by our industry generally. Secondly, let me remind you that the men actively connected with the development of the Institute have been interested in the gas industry and in the American Gas Association, and they continue to be. In fact, many of them have been leaders in support of the American Gas Association and continue to have at heart the interests of the association and the industry it represents.

Repeatedly, statements have been made by members of the new board that they fully expect to avoid duplication of effort. That if a proposal comes before the board to undertake research which can be done more quickly, less expensively, more logically at Cleveland, they will want to suggest that Cleveland undertake it. That in their capacities as members of American Gas Association they will be interested to attempt to see that funds adequate to cover the needed work are raised within the association. In other words, while the Institute expects to encompass fundamental and applied research without unnecessary restriction, it wants to constitute an additional facility and not to attempt to replace any agency which is already exceptionally qualified for research in certain fields.

Utility Questionnaire

The reality of their position becomes clear at once when one contemplates how limited will be the amount of research which can be undertaken for $100,000 a year, or even twice that. During the organization of the Institute questionnaires were sent to between 400 and 500 utilities asking their ideas about what research problems the industry had before it. The replies comprised nearly a dozen printed pages, ranging all the way from relatively restricted problems to such gargantuan ones as showing us how to make money in the gas business. Many of the proposals do not lend themselves to research, of course, but the number and scope of the problems which can be tackled on a long term basis is tremendous. No single agency can begin to cover the field, especially not for $100,000 a year.

Now that the Institute is beginning

to function, we may expect its coordination of research to benefit the industry immediately. I see every reason to expect the finest degree of collaboration between it and the Cleveland staff. Out of it I fully expect will come a comprehensive *joint* suggestion for much needed utilization research which we need now and which could be programmed within the capacity and facilities of the Cleveland laboratory. Would it be expecting too much to ask the association to finance that activity as well as to support the Institute? I think not; in fact I think the very knowledge that our research efforts are being coordinated to the fullest extent will encourage rather than retard interest and support of research by the industry.

3. Financing and Equipment

By HERMAN RUSSELL

President, Rochester Gas and Electric Corp., Rochester, N. Y.

IT IS my purpose in this report to present something of the financing of the Institute of Gas Technology, the required budget, the present facilities and future aims.

Relying largely upon the experience and judgment of Dr. Westbrook Steele, director of the Institute of Paper Chemistry, the Research Organization Group determined upon an annual minimum budget of $100,000 as being necessary to properly launch the institute, take care of operating expenses and provide some funds for equipment and buildings. It is realized that this is a very meager sum with which to provide a research and training program for an industry as large as the gas industry, but it is felt by all members of the group that it is wise to start modestly and let the institute prove its worth and demonstrate its value to the industry. Adequate financial support to take care of growth will, I am sure, be provided if there is need and the institute proves to be the success that we anticipate. There will be, we expect, a constantly growing income to the institute from research studies financed by individual companies and groups of companies, problems requiring solution that are of immediate concern to such companies and of sufficient interest to the gas industry to warrant the studies being undertaken by the institute. The budget of $100,000 will, we feel, launch a very worth-while training and research program. The items making up the budget for the first year's operation are shown in Table No. 1.

An examination of this budget demonstrates the financial advantage of the affiliation with the Illinois Institute of Technology, for in no other way could such a program be undertaken at such a modest cost. As the Gas Institute grows and demonstrates its value, additional buildings and space will have to be provided either by the Illinois Institute or financed by the Institute of Gas Technology. In the budget an item of $24,000 is for building and library.

In launching the institute all members of the organization group agreed with the recommendation of Dr. Steele that it was necessary to provide for a 10-year financing program. It was felt that a 10-year period would be necessary for the institute to prove itself, and it was realized that it would be impossible to affiliate with an educational institution, secure an adequate and competent staff, provide an education and training program on any shorter basis. Therefore, subscribing member companies are asked to commit themselves to this program for 10 years. Inasmuch as the maximum membership contract is for $5000 yearly and the minimum $100, this should not and has not to date proven a serious hurdle. The basis of the assessment for member gas companies has been fixed at an annual amount of one-tenth of 1% of gross gas income, as determined by the company's average over the past three years. In this way those companies best able to pay contribute the larger amounts. Gross income is defined as gross gas revenue less operating expenses, taxes and depreciation. Inasmuch as the gross income for the industry as a whole has averaged during the last three years about $200,000,000, if all companies came in, the revenue would be $200,000. I have estimated that we may expect a 50% participation of member gas companies.

TABLE No. 1. BUDGET FOR FIRST YEAR OPERATIONS.

Administration		
Director		$ 7,500
Treasurer		1,200
Secretarial and stenographic		3,360
		$ 12,060
Staff		
Technical director		$ 10,000
Staff members		20 000
		$ 30,000
Fellowships		
Six fellowships at $675.00		$ 4,050
Expenses		
Telephone, telegraph and postage		$ 2,000
Office supplies		1,200
Publications and bulletins		2 500
Rent (includes janitor, heat, light and power)		3,000
Alteration of space		2,500
Furniture and fixtures		1,200
Instructional and research equipment		10 000
Legal expense		500
Travel		5,000
General expenses and reserve		2,000
		$ 29,900
Funds		
To building and library fund		$ 23,990
TOTAL		$100,000

A. G. A. E. M. Endorsement

The executive board of the Association of Gas Appliance and Equipment Manufacturers has endorsed the program and their membership contribution will be based upon capital and surplus, probably on the schedule of payment as provided by the National Association of Manufacturers. This basis will provide about the same revenue as the one-tenth of 1% gross income basis and in their case is more satisfactory to them. Revenue from this source should prove a material aid in the financing. In addition, there will be some revenue from allied industries closely identified with the gas industry, such as carbon black, oil and chemical companies.

To date 17 gas companies have signed contracts totaling $32,000 annually. It is expected that by the time the institute opens on September 22 (See page 00) at least half of the $100,000 budget will have been raised. Facilities for the needs of the Gas Institute for the first two year period have been provided in a new one-story building on the campus of the Illinois Institute of Technology. The alloted space will provide for educational facilities for about 20 graduate students, five or six the first year, and an additional 15 the second year. The layout provides for primary laboratories to undertake both applied and fundamental research. The existing laboratories and facilities of the Illinois Institute will be available for the research program. There will be a lecture room and office units sufficient for faculty members, as the faculty of the Gas Institute is being supplemented by members of the staff of the Illinois Institute. There is a seminar and reading room to house special Gas

Technology publications and to provide study space for the students.

The Gas Institute is desirous of selecting its first group of students from a sizable number of candidates for fellowships. Member companies are urged to canvas their employees who are young engineers and can qualify for the program. These men, if interested, may secure fellowship application forms by writing to Harold Vagtborg, in care of the Institute of Gas Technology at 3300 Federal Street, Chicago, Ill.

As the value of research to the industry becomes better appreciated, as the institute demonstrates its value and usefulness in the solution of the many technical problems confronting the industry, as its findings open new doors, and its trained research personnel sifting through the industry sow the seeds of technical progress, the Gas Institute must needs increase its facilities to meet the enlarging program. To illustrate how an institution of this kind grows, it is interesting to note that about 10 years ago the paper industry established the Institute of Paper Chemistry with an annual budget of about $50,000, a staff of three, and almost no plant or equipment. Today the budget exceeds $400,000, there are nearly 100 on the staff, and buildings and equipment are valued at more than $1,250,000.

Another example is the Armour Research Foundation, also affiliated with the Illinois Institute, which is engaged in industrial research exclusively and commenced operations five years ago with a budget of $75,000 and now receives research appropriations from industry at the rate of over $400,000 annually.

Two recent statements relative to the field of research are of interest. The first is from the July bulletin *Industrial Facts*, published by the National Association of Manufacturers: "American companies have increased their research personnel by 41% in the last two years and are now spending 6% of their total net income on industrial research." And from a recent issue of *Industrial and Engineering Chemistry:* "The new Central Research Laboratories of the General Foods Corporation completed their first full year of operation in 1940. The report indicates that when the results of the research work done in that one year are applied to production they will pay not only the cost of the new laboratories, but the operation costs of the research of the Corporation for years to come."

There is every reason to feel that the Institute of Gas Technology will accomplish for the Gas Industry what these and other research institutions and laboratories are doing for industry generally. Where there is so much to be gained and so little to lose, I am confident that the Institute of Gas Technology will receive the wholehearted support of the industry.

The gas industry has two outstanding accomplishments to its credit -- the national advertising program and the Testing Laboratory. Now it has launched a third undertaking, which in my opinion meets a need even more essential than that taken care of by the laboratory and the national advertising program.

Gas Research In England

THE basis of cooperative research* in the gas industry has recently been broadened and extended by the formation, on the recommendation of the council of the Institution of Gas Engineers and of the Society of British Gas Industries of an automonous (incorporated) Gas Research Board.

The Gas Research Board has been functioning for some months past, pending its incorporation, and the council of the Institution of Gas Engineers has entrusted to the council of the Board the direction and control of the research work that had previously been pursued by the Institution through its research executive committee. The first annual report of the council of the Board, published in November, 1940, sets out briefly the constitution, policy and program of the Board, and gives an account of the investigations at present being carried out for it by its research staff (the former research staff of the Institution) at Leeds University, by the British Refractories Research Association, the National Physical Laboratory and elsewhere.

The council of the Gas Research Board comprises nine members appointed by the Institution of Gas Engineers, six members appointed by the Society of British Gas Industries, and up to five co-opted members (university professors, scientists and the like). If the Board is at any time in receipt of a grant from the government, the Department of Scientific and Industrial Research will be entitled to appoint two representatives to serve on the council.

The registered offices of the Gas Research Board are the same as those of the Institution of Gas Engineers (1 Grosvenor Place, London S. W. 1) and the secretary of the Institution has been appointed the first secretary and acting director of research of the Board.

Among the objects of the Gas Research Board are the promotion and support of research in connection with the gas industry and industries allied therewith (and for this purpose to establish and maintain, if and when thought fit, laboratories and the like), to collaborate with kindred research organizations, to publish reports, to collect relevant information and to establish and maintain for the benefit of its members a bureau of information.

For the purposes of the articles of association the gas industry is defined as (a) the manufacture or distribution of gas or (b) the design or construction of works, machinery, plant or apparatus for the manufacture, distribution or use of gas, or of the byproducts of the manufacture of gas, or (c) the manufacture or working up of byproducts by undertakings manufacturing or distributing gas, or (d) research work connected with the manufacture, distribution or application of gas or of the byproducts of the manufacture of gas. It thus embraces all the carbonizing and gasification industries.

*Excerpt from *The Gas Times*, August 16, 1941, published in London, England, 29 Grove Road, Leighton Buzzard.

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Five Hundred Navy Homes to Have Natural Gas Service

The United States Navy in its ship-building program at Orange, Texas, has constructed, for defense workers and their families, 500 natural gas served dwelling units requiring some 250 buildings of one to four units each.

In selecting the cooking, water heating and heating equipment for these units, the Navy Department made a survey of the merits of various fuels available. The result of the study was the placing in each of the dwelling units a gas range and a gas automatic water heater, operated with natural gas distributed by the United Gas Corp, Houston, Texas, of which W. F. Ivers is district manager.

All rooms are equipped with gas outlets for sectional heating. Five hundred gas ranges and gas automatic water heaters were installed. Bills are rendered to the occupant of the dwelling unit rather than the group as a whole.

■ ■

Eighth Hetch Hetchy Bond Vote Slated for November

On November 4th the voters of San Francisco will go to the polls to vote for the eighth time whether they will bond themselves for $66,500,000 to purchase the Pacific Gas and Electric Co.'s electric distribution system in that city.

Another slash in the company's gas and electric rates is a possibility in northern California, but the Railroad Commission is expected to defer action thereon until after the bond election.

Suction and Discharge Piping Problems

In Natural Gas Compressor Station Operation

By C. S. KENWORTHY

Natural Gas Pipeline Company of America, Chicago, Illinois

IT IS a well-known fact that the use of reciprocating engine-driven compressors on high pressure gas pipe lines gives rise to more or less serious pressure surges in the interconnecting piping. However, just what conditions will cause a serious surge, what steps must be taken to eliminate it, and the manner in which the operation of the compressor and engine are affected are not so well known.

The paper "Characteristics of Gas Flow Through Compressor Plant Suction and Discharge Piping," presented by John Rogers and published in the May, 1939, issue of *GAS* made available some very valuable information in regard to conditions encountered in low pressure installations. There seems to be almost no published data on this subject in regard to high pressure pipe line installations.

Information obtained from tests at several stations of the Natural Gas Pipeline Company of America is presented as a contribution toward the solution of this problem.

Explanation: A brief description of the conditions under which the tests have been conducted will be of assistance in understanding the data presented. The pipe line extending from Fritch, Texas, to Joliet, Ill., is a 24-in. line which supplies gas to the Chicago area. There are 63 main engine compressor units installed on the system, 15 at Fritch, six at each of three line stations and five at each of the remaining line stations. All of these units are 1250 I.C.H.P. twin tandem 24x36-in. gas engine-driven compressors. The diameter of the compressor cylinders at the field station is 12⅝-in., and on the line stations is 13⅛-in. At the only field station, No. 1, 12 units operate continuously at 180 to 220 lbs. per sq. in. suction and 740 lbs. per sq. in. discharge pressure. Nine line stations, numbered 2 to 10, and spaced 75 to 100 miles apart, operate at 410 to 500 lbs. per sq. in. suction and 690 to 712 lbs. per sq. in. discharge pressure.

In this paper, for convenience, the piping from the 24-in. suction header to the compressor cylinders and from the cylinders back to the 10-in. header later referred to will be termed the individual suction and discharge piping.

No attempt will be made to compare the results obtained at the field station with any of the line stations because of the widely different suction conditions. However, a comparison is made at this station to show the effect of increasing the suction piping from 6-in. to 8-in. diameter and inserting a volume chamber in both the suction and discharge piping.

There are several arrangements of the individual compressor piping on the line stations and a comparison is made to show the effects of different lengths of piping on pressure surge. Stations 4 and 5 have the shortest individual suction and discharge lines, Stations 2, 6, 7, 8 and 10 have the next longest, and Stations 3 and 9 have the longest piping. The individual suction piping at all stations, including the field station, connects directly into the 24-in. headers. The individual discharge piping connects directly to an intermediate 10-in. header. This 10-in. header is connected to the gas cooling coils in the bottom of the cooling tower. The length of the discharge piping up to the 10-in. header is the same at all stations. The piping from the gas cooling coils back to the 24-in. discharge header varies in length in a manner similar to the suction piping. It is important to note that the presence of the 10-in. header produces practically identical conditions in the individual piping at all of the line stations.

There are six engines on the system —three at the field station and one each at Stations 2, 3 and 9—which have 8-in. discharge piping connected from the cylinder to a 12-in. diameter volume chamber and 10-in. suction piping connected to a 16-in. diameter volume chamber. These volume chambers extend to a point just beyond the building wall. Outside the building wall the individual discharge piping is 6-in. diameter and the suction piping is 8-in. diameter. The standard individual piping on all of the remaining units on the system is 6-in. discharge and 6-in. suction throughout. The several arrangements of piping are shown on the Data Sheet, Fig. 1.

Reasons for Investigation: There were several reasons for making an investigation of the compressor loading and these are given below:

1. The fuel consumption at the field station and at Stations 4 and 5, as obtained from fuel meter readings and from the horsepowers from loading charts, is higher at the above stations by 5% or 6% than at any of the other stations. This is true in spite of the fact that the operating conditions which affect the fuel consumption, such as fuel manifold pressure, mixing valve settings, ignition timing, and water temperatures, are practically the same at all stations. Indicator cards taken on the power cylinders led us to believe that the compressor loading might be the cause of the high fuel consumptions.

2. There was a tendency for the engines at some stations to "die" when slowed down to certain speeds. From indicator cards on the power cylinders an increase in the engine M.I.P. (mean indicated pressure) was found at the slow speeds. To determine the cause of this high M.I.P. it was necessary to investigate the compressor end.

3. The tendency of the engines at some stations to "hunt" when operating in certain speed ranges was at first difficult to explain. However, it became more and more apparent, as the engines were observed in operation,

C. S. KENWORTHY

C. S. KENWORTHY, for the past three years has been the assistant superintendent of the compressor station department for Natural Gas Pipe Line Co. of America, Chicago, Ill. Before that time, he was for 15 years affiliated with Worthington Pump & Machinery Corp., at Buffalo, N. Y. He is a graduate of Cornell University, Ithaca, N. Y. The excerpts presented herewith were taken from Mr. Kenworthy's paper, which was presented before the annual convention of the Natural Gas Section of the American Gas Association at Dallas, Texas, May 5-8, 1941. Mr. Kenworthy's paper will be published in its complete form by the American Gas Association in its proceedings for the current year.—Editor.

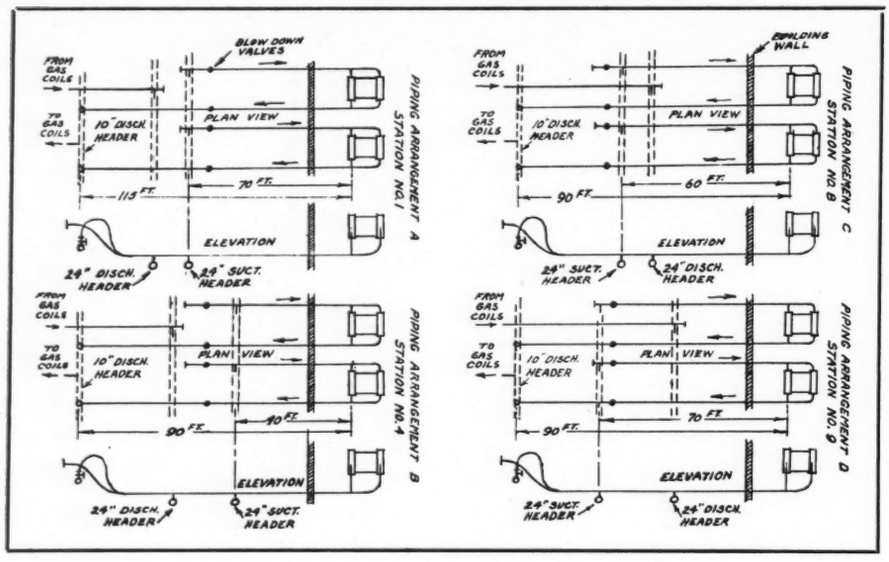

FIG. 1. Several station piping arrangements.

that something peculiar was happening to the load. Investigation of the compressor loading was necessary to explain this phenomenon.

Procedure: Indicator cards were taken at various speeds at the compressor cylinders, at the thermometer well holes in the piping next to the compressor cylinder flanges and also at the blow-down valves on both the suction and discharge piping. Great care was exercised to obtain accurate indicator card data. Aeroplane fuselage wire, which is very pliable and yet does not stretch, was used and this wire was stretched taut with a rather stiff spring. This resulted in satisfactory cards, even with the indicator located on the compressor blow-off valves in the yard.

DISCUSSION

In the following discussion reference is made to two terms which might be ambiguous without an explanation.

The "chart" horsepower (C.H.P.) and capacities are the horsepower and capacities calculated with standard compressor formulas which have been recorded in curve form for convenient reference. The values of horsepowers obtained from these curves include an estimated compressor value loss, and the capacities take into consideration effect of the compressibility of the gas.

The term M.I.P. as used in the discussion for either the power or compressor cylinders, is the mean indicated pressure as obtained by measuring the area of an indicator card, dividing by the length of the card and multiplying by the scale of the indicator spring used.

All indicator cards taken have been blocked off by drawing the gauge suction and discharge lines. This is done to show clearly the varying effects of the piping surge. On the Data Sheet, Fig. 2, are shown sample cards taken at Station No. 4 at 65 and 125 r.p.m. The top cards demonstrate specifically the manner in which different types of surge affect the M.I.P. The cards at the bottom of this sheet show not only the card taken from the compressor cylinder, but also corresponding cards in dotted lines taken under the same suction and pressure conditions on the suction and discharge piping immediately beyond the compressor valves. If these cards are observed closely, it will be apparent that the general shape of the cards is controlled very largely by the type of piping surge. Card No. 38, taken at 125 r.p.m. has a surge which produces a very rounded end at the beginning of the compression stroke, whereas the reverse surge at 125 r.p.m. produces a very sharp end, as shown on Card No. 34. In both cases it is observed that the compressor cylinder is filled with gas, not at the gauge suction pressure, but at a pressure considerably higher.

On the top left-hand card, the manner of obtaining the volumetric efficiency is demonstrated. As this method is not generally accepted by the industry, an explanation is in order. The compression line is extended (if necessary) to the beginning of the delivery stroke and the cylinder is assumed to have filled at the corresponding pressure. In the case of Card No. 34 the card comes to a sharp point and it is unnecessary to extend the compression line. With a card like No. 38 the rounded point makes it necessary to extend the compression line to the left to determine the pressure at which the cylinder is filled with gas. A line is drawn from this point parallel to the gauge suction line. The volumetric efficiency is obtained in the normal manner by measuring along this line, and is then corrected for the difference in the absolute pressure represented by this line and the absolute suction pressure. It is of interest to note that the stations which supercharge considerably at operating speed, deliver more gas than is theoretically possible even when the supercompressibility of the gas is taken into consideration. However, when the volumetric efficiency is determined as above described, the actual capacity of the station very closely checks the capacity obtained by the use of indicator cards.

In presenting the capacity and horsepower data in curve form, it has been considered desirable to take cognizance of the fact that all data was not taken at the same suction and discharge pressure conditions. Otherwise any comparison of capacities or of the M.I.P. would not be directly comparable. The following method was therefore decided upon. The horsepower obtained from the compressor cards (I.C.H.P.) was divided by the horsepower obtained from our standard charts. This results in a horsepower ratio which is equal to 1.0 when the card horsepower checks the chart horsepower. This automatically eliminates the effect on the horsepower due to small changes in pressure conditions and gives a curve which is similar to an M.I.P. curve taken at constant suction and discharge. The same procedure was carried out in obtaining the capacity ratio.

The effect on the total I.C.H.P. per MM c.f. is indicated by the curves on friction loss. However, as the friction loss is found by subtracting the C.H.P. per MM c.f. obtained from our standard charts from the I.C.H.P. per MM c.f. obtained from the cards, small percentage errors in determining the I.C.H.P. and capacity from the indicator cards result in very large percentage errors in the friction loss. Any conclusions drawn from the friction loss curves must therefore be made with full realization that 50% errors or even greater in friction h.p. are easily possible.

CONCLUSIONS

There are several conclusions which can be drawn directly from the data obtained.

1. The three different lengths of suction piping which are encountered on the line stations each have different pressure wave characteristics due to the inertia of the gas. These pressure

variations which occur have very decided effects upon the engine loading. As the speed is varied with a constant suction and discharge pressure, it is possible to obtain as much as 15% to 20% variation in M.I.P. The fact that the I.C.H.P. at Stations 1 and 4 at normal operating speeds from 100 to 125 r.p.m. is actually above the chart horsepower, whereas at Stations 8 and 9 it is either equal to or below the chart horsepower, accounts for the apparent high fuel consumption obtained at Station No. 4. Similar data obtained at Station No. 5 substantiates this fact.

2. The comparatively sudden automatic increase in M.I.P. with a reduction in speed at certain speed ranges produces a condition which tends to be inherently unstable as far as governor operation is concerned. This accounts for the fact that the engines at Stations 8 and 9, and all other stations with similar piping, are difficult to govern at speeds below 100 r.p.m., whereas at Station No. 4, as well as Station No. 5 with similar piping, there is no such inherent difficulty. This trouble experienced at certain stations with governing is explained by the fact that as the engine slows down for any reason whatever and the governor opens the fuel valves to feed more fuel to the power cylinders, the load is automatically increased because of the lower engine speed and requires more fuel than it otherwise would. The reverse is true when an engine speeds up. The result is that it is much more difficult for the governor to handle the engine in the range of speeds where this phenomenon occurs.

To illustrate this, the horsepower ratio curves for Station No. 9 have been reproduced on the Data Sheet, Fig. 3, but the ordinates of the curve are shown as power cylinder M.I.P. Superimposed on these curves is a hypothetical curve of M.I.P. produced by the power cylinders for a range of speeds corresponding to the complete travel of the governor collar and of the mixing valves. It is very apparent in studying this curve sheet that if the governor is in good condition it should be able to handle the M.I.P. variations produced by the No. 6 engine-compressor unit equipped with the volume chambers on the compressor piping. On the other hand, it is also plain that the best governor made, with all linkages tight and the mixing valves operating perfectly, might have a difficult time taking care of the M.I.P. variations on the units which have the 6-in. suction and discharge piping.

3. When there is temporary difficulty on an engine, such as ignition trouble or a sticking exhaust valve, an engine will naturally slow down. If the engine is already on a heavy load, the large increase in M.I.P. which occurs due to the increase in piping surge at lower speed may increase the loading to the point where it will shut the engine down instead of allowing it to pick up again as it normally would. This same effect, even in normal operation, tends to make an engine perform in a very sluggish manner.

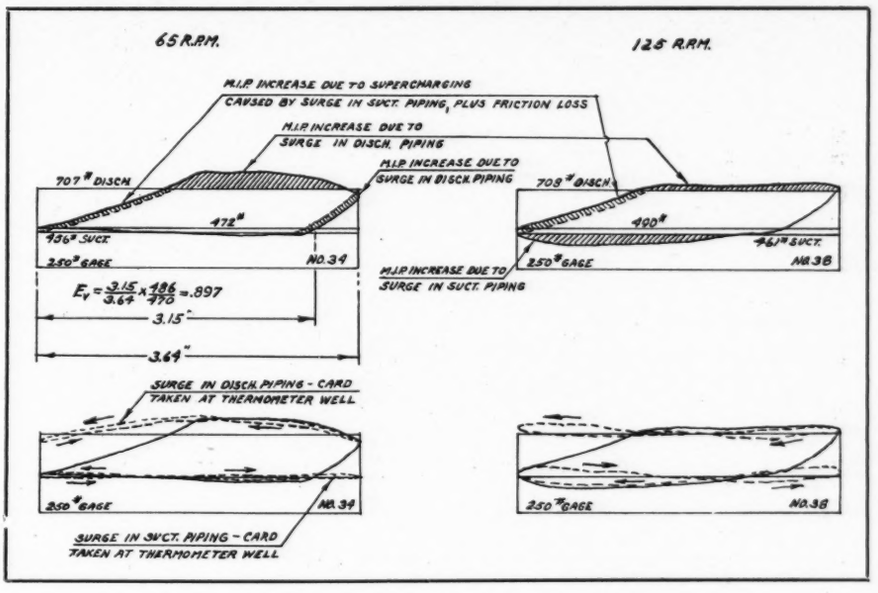
65 R.P.M.
125 R.P.M.
M.I.P. INCREASE DUE TO SUPERCHARGING CAUSED BY SURGE IN SUCT. PIPING, PLUS FRICTION LOSS
M.I.P. INCREASE DUE TO SURGE IN DISCH. PIPING
M.I.P. INCREASE DUE TO SURGE IN DISCH. PIPING
707 # DISCH
472#
436# SUCT.
250# GAGE
NO. 34
708 # DISCH
490#
461# SUCT.
250# GAGE
NO. 38
M.I.P. INCREASE DUE TO SURGE IN SUCT. PIPING
$E_v = \frac{3.15}{3.64} \times \frac{486}{490} = .897$
3.15"
3.64"
SURGE IN DISCH. PIPING - CARD TAKEN AT THERMOMETER WELL
250# GAGE
NO. 34
250# GAGE
NO. 38
SURGE IN SUCT. PIPING - CARD TAKEN AT THERMOMETER WELL

FIG. 2. Sample cards taken at Station No. 4.

4. The data indicates that there is no very appreciable increase in the horsepower per million required to pump the gas except in the case of the very severe surges on the discharge stroke around 65 to possibly 80 r.p.m. on the line station compressors. At normal operating speeds there is very little to be saved in power by making any change in the 6-in. compressor piping. As the operation on this pipe line does not require operation below 95 r.p.m., it was decided not to go to the expense of increasing the size of the individual piping or of installing volume chambers close to the compressor cylinders.

If it had so happened that the very extreme surge which occurs at 65 r.p.m. on the line stations had occurred at some speed from 95 to 125 r.p.m. it would probably have been found economical to at least install volume chambers in the discharge piping.

5. Before the data was obtained in regard to the nature of the surge in the compressor piping it was impossible to properly check the capacities of the stations. At the present time, however, it is possible to check the station capacities from the data available to fairly close limits. The result is that we are now able to determine very definitely whether or not there is leakage of any kind taking place at any particular station. If the figures indicate any appreciable amount of leakage, the station is notified and the leakage is stopped.

Capacity and horsepower tabulation for Station No. 4 show that at 125 r.p.m., 461 lbs. suction and 708 lbs. discharge, the capacity of each unit obtained from the charts is 57.6 MM c.f. per day or 230.4. As the actual capacity pumped at this station is approximately 220 MM c.f., this would indicate the station should operate at approximately 120 r.p.m. This was actually the case until the proper data was available.

The actual capacity from indicator cards, using the method of obtaining the volumetric efficiency previously explained, is 62.2 MM c.f. per unit or 248.8 MM c.f. at 125 r.p.m. and 25.9 MM c.f. at 120 r.p.m. and 219 MM c.f. at 110 r.p.m. This data was evidence that there was considerable leakage at the station. Correction of this leakage resulted in this station operating at 110 r.p.m. which is now the normal speed for the engines at this station as compared with 120 to 125 r.p.m. previously.

As a result of this checking we have found that it is possible for a great deal of leakage to take place past the gaskets under the compressor valves. In order to prevent this type of leakage, we are now using a much more substantial type of gasket than we have done in the past and the valves are being held more solidly against the gaskets than in the past with the jack bolts

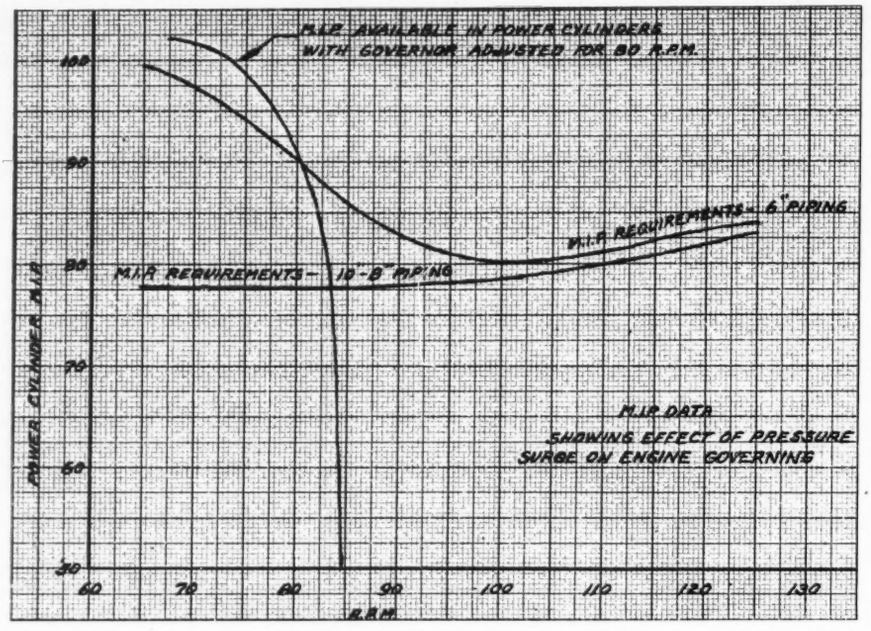

FIG. 3. Horsepower ratio curves for Station No. 9.

The practical non-existence of the located in the valve cover plates.

6. The fact that indicator cards taken at the thermometer well location show the same characteristic surge at the O.B. cylinder as at the I.B. cylinder is proof that the short lengths of piping extending down to the common 6-in. piping have no appreciable effect on the piping surge.

surge at the blow-off connection on the suction piping is proof that the surge is not present in the 24-in. suction header.

The fact that indicator cards taken on different units at the same station show the same surge characteristics is quite definite proof that there is no appreciable surge in the discharge header piping, either the 10 in. or the 24 in. The identical pressure surges synchronized with the individual compressor units could not be caused by surges in the station headers unless the units were synchronized in operation.

From the above it is apparent that it is only necessary to install sufficiently large pressure volume chambers close to the compressor cylinders to eliminate the surges in the piping. Naturally it can also be accomplished by installing sufficiently large piping, but at a greater cost.

Combining the headers for the compressor cylinders of a given unit, and thus producing pulsations in gas flow which overlap each other should result in considerably smoother operation and at the same time should allow the designer of a compressor station to reduce the overall cost of the piping installation.

Natural Gas Serves 19 U. S. Army Posts

THE natural, manufactured and liquefied petroleum gas industries of the country are playing an important part in the national defense program, according to G. S. Holmes, of the Public Relations Section, U. S. War Department, Washington, D. C.

At this time, there are a total of 19 Army posts and four General Hospitals using natural gas for all purposes, or for cooking, water and space heating, or for cooking and water heating.

The diversity of purposes for which the fuel is used at the various stations is due to the fact that it has been the policy of the War Department to select the fuel which will provide the required services at the least cost.

Many of the stations—both those using natural gas and those using manufactured gas—have not been in existence for a sufficient length of time to obtain accurate consumption figures, but it is estimated that at the 23 stations using natural gas, the annual consumption will be 15 billion cu. ft.

Because of its higher cost, use of manufactured gas has been somewhat restricted. Nevertheless, the estimated annual consumption, at the six Army posts and two General Hospitals where it is used, will be about 278,000,000 cu. ft. per year. It might be noted that these posts where manufactured gas is used are somewhat smaller than the regular training posts.

Use of liquefied petroleum gas has been confined largely to three military stations in California, and one in Florida. At the California stations, the gas is used for all purposes, except the central heating plant, while at the Florida station, use of it is confined to cooking. Use of this gas for the several purposes is somewhat new in the Army and accurate figures, therefore, are not available, although it is expected that a considerable quantity will be consumed at the four stations.

The 19 Army posts and four general hospitals using a natural gas, and the purposes for which each uses it, are as follows:

*Barkeley, Abilene, Texas.
*Bowie, Texas.
*Cookson Hills, Okla.
†Callan, Calif., and San Diego Replacement Center, Calif.
*Claiborne, La.
‡Hoff General Hospital, Calif.
*Huachuca, Ariz.
*Hulen, Texas.
*La Garde General Hospital, New Orleans, La.
‡Lawson General Hospital, Ga.
*Livingston, La.
*Ord, Calif.
*Salinas, Calif.
‡San Luis Obispo, Calif.
†Santa Maria-Lompoc Area, Calif.
†Smith (Fort), Ark.
*Wallace, Texas.
*Wolters, Texas.
*Cronkhite, Calif.
*O'Reilly General Hospital, Springfield, Mo.
*Camp Polk, Leesville, La.
*Beauregard, La.

*Gas used for all purposes.
†Gas used for cooking, water heating and space heating only.
‡Gas used for cooking and water heating only.

The six Army posts and two general hospitals where manufactured gas is used, and its purpose at each follows:

†Barnes General Hospital, Vancouver, Wn.
†Billings General Hospital, Ind., Eglin Field, Florida — Propane gas — Cooking only—Haan, Calif.—Butane gas—All purpose except Central Heating Plant.
*Orlando, Fla.—Mojave Desert Cantonment, Calif.—Butane gas—All purposes except Central Heating Plant.
Camp Roberts, Calif.—Butane gas—All purposes except Central Heating Plant.
†West Palm Beach, Fla.

*Gas used for all purposes.
†Gas used for cooking and water heating only.

Studies concerning the selection of fuel are in progress and it is possible that future stations will employ either natural or manufactured gas.

Eliminating Hazards in Buildings By Surveys

By T. W. ROBERTSON

Arkansas Louisiana Gas Co.,
Shreveport, La.*

WE, in the gas industry, are more or less familiar with the characteristics of natural gas. On the other hand, the average consumer thinks of it only as a convenient and efficient method of cooking, heating, water heating, and refrigerating. If the customer takes this position, then it behooves the gas company to take the position that he should be rendered every particle of knowledge which will permit him to use our product in the safest manner.

For this reason, we began a program to educate our customers in the proper use of our product by means of systematic surveys of public and commercial buildings. This program consists of a survey and inspection of customers' premises with the use of a gas detector machine. Inspections are made to determine the condition of gas company and customer equipment through which our product is used. These surveys are handled locally in larger towns. In small towns a man is sent from the Division Office to aid the local managers in the work.

On our original survey we use two men. One man makes a sketch of the building showing the floor plan, location of gas lines and meter, and points tested. Permanent test points are located on this sketch and are available for future surveys. The other man operates the gas detector machine and makes tests at these points. The tests are recorded and signed by the machine operator and are kept as a permanent record.

Tests for the presence of gas are made outside of the building from any underground source. This is done by testing samples of atmosphere from water meter boxes, curb boxes, curb meter boxes, barholes, and cracks in pavement. A service plug is installed over gas lines which enter buildings under concrete to give a positive test point at this location. The testing of the service at the last point before it enters the building is an important phase of the survey, inasmuch as this is one of the best ways of ascertaining whether or not any escaping gas from mains or services can enter the building. All meter loop fittings, meters, and regulators are tested. Tests of atmosphere under the floor and in walls are made at ventilators, holes, and cracks in walls. In the basement tests are made at points where gas, sewer, and water lines enter. Particular care is taken to test all water drains.

On each floor all gas connections, holes or cracks in the floor or walls are tested. All unvented large capacity gas appliances such as hot water heaters, and circulating heaters are tested for carbon monoxide. This is done by sprinkling a few drops of palladium chloride solution on specially treated absorbent paper and inserting this paper in toxic chamber of instrument. Samples of gases from the flue are drawn into the chamber and trapped. The treated area of paper turns black in the presence of carbon monoxide. Carbon monoxide in concentrations as low as 0.05% may be detected in this manner.

Any hazard found on a customers' premises is eliminated if possible without the use of materials. If the condition is such that it cannot be eliminated immediately, and is not of such consequence to cause immediate trouble, the customer is requested to sign a "trouble ticket" notifying him to have same repaired at once. Steps are immediately taken to eliminate any existing condition which is hazardous.

Occupants of buildings are notified of the following conditions: House lines under wood floor where there is improper ventilation, house lines under cement floors, rubber hose connections, gas meters installed inside buildings, house line openings not properly capped, house line leaking or in bad condition, gas leaking in appliances not properly turned off, openings through floors or walls of basement not sealed, house lines not securely fastened, basements not properly ventilated or drained, flammable materials near open fires, bad gas meter locations, such as under the building, gas service in building not used, service line leaking, appliances in bad condition, gas lines in strain supporting appliances or motor, oil or gas line not our property under or near building, appliances near flammable material, and appliance connections in bad condition.

At the end of each day trouble tickets are made on all company equipment in need of repair. These tickets are turned over to the local manager for handling.

Letters are written to occupants of buildings notifying them of any condition which we think is bad practice. Recommendations are made as to the remedy for these conditions. The owner of, or agent for, the building is sent a copy of these letters.

We believe these letters have been very valuable to us to the extent of encouraging people to be more careful in using our product. From the number of inquiries received from the consumers we have notified regarding conditions found, we believe a large number of such conditions, which consumers had been prone to ignore or of which they were not aware, have been remedied.

The results of the original survey, involving approximately 9300 buildings reflect a ratio as follows:

Customers' premises found hazardous, 1%.

Leaks from property line to customers' house lines, 19%.

Leaks on customers' house lines, 44%.

Letters written to customers, 62%.

Results of the follow up or second survey, which involved approximately 1048 buildings, as compared to the original survey are found in the ratios shown below:

Customers' premises found hazardous, 0.6% (a decrease of 0.4%).

Leaks from property line to customers' house lines, 7% (a decrease of 12%).

Leaks on customers' house lines, 10% (a decrease of 34%).

Letters written to customers, 30% (a decrease of 32%).

It will be noted that in our original survey we found 1% of the customers' premises hazardous. These conditions were immediately remedied. In our second survey we found 0.6% hazardous. These were also remedied.

I believe we may assume from these figures that the survey is accomplishing the results originally intended and, if we do nothing more than convince our customers that gas can and should be handled correctly, we will reduce personal injury and property loss.

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*Delivered at Arkansas Utilities Association Convention, Hot Springs, Ark., April 28, 1941.

Western Gas Co. Enlarges Plant at Bremerton, Wash.

Completion of a $25,000 expansion program in the Western Gas Co. of Washington's plant and distribution system at Bremerton, Wash., has been announced by E. H. Cookingham, head of the concern.

Among the most important projects in the expansion was the installation of the first gas main to East Bremerton and Eastpark. Additional gas manufacturing units, larger compressors and storage capacities have been added and new high-pressure mains have been installed from the plant to Puget Sound navy yard, said Mr. Cookingham.

AT LEFT: Five tractors lowering pipe for the line.

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Natural Gas Pipeline Company of America's

Pipe Line Project Nears Completion

ONE year ago, the Natural Gas Pipe Line Co. of America, Chicago, which brings natural gas from the Texas and Kansas fields to Chicago, announced plans for a dual pipe line construction program. The first project was to lay 100 miles of 20-in. pipe line from the company's main transmission line compressor station at Geneseo, Ill., to the Wisconsin state line in order to bring natural gas to northern Illinois communities for the first time. (GAS, December, 1940, pp. 13-16). Second part of the plan was to enlarge the main trunk line transmission system, which was constructed in 1931, between the Texas Panhandle and Chicago by the construction of five loops to consist of a total of 403 miles of 26-in. pipe. (GAS, April, 1941, pg. 15).

Today, the first half of the program is completed and the second is showing definite indications of becoming a reality before January 1. The first two loops of the Texas Panhandle-to-Chicago line are now completed and construction has begun on the third and fourth loops.

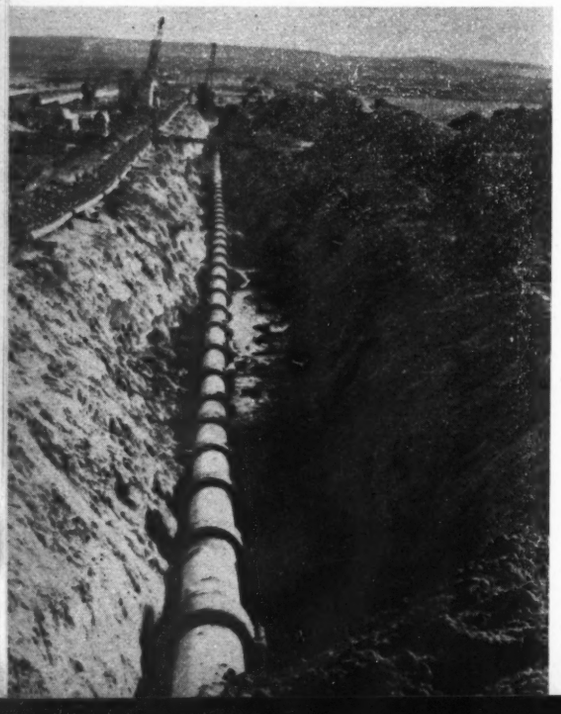
The five additional loops, which will double the existing capacity of the line, will operate at 712 lbs. pressure. The additional loops will add 50,000,000 cu. ft. per day to the present capacity of 210,000,000 cu. ft. per day. Multiple lines at 20 river crossings will be constructed in addition to the 403 miles of 26-in. pipe for the loops.

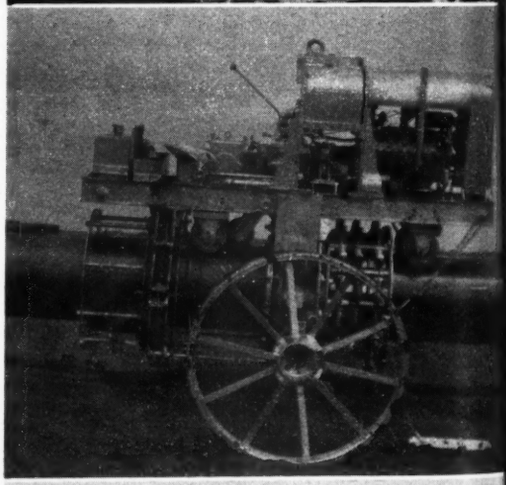
The first loop, which originates at the company's new 4000-B.H.P. compressor station in Moore county, Texas, and extends 33 miles northeast of that point, was constructed by the Texoma Natural Gas Co., an associate of the Natural Gas Pipe Line Co. The second loop, which runs adjacent to the company's present line, extends from Mead county, in southern Kansas, 87 miles northeast. Its completion date scheduled for the latter part of this month, the third loop will extend from the southeast part of Russell county, Kansas, to the northern part of Washington county, Kansas, a distance of 96 miles.

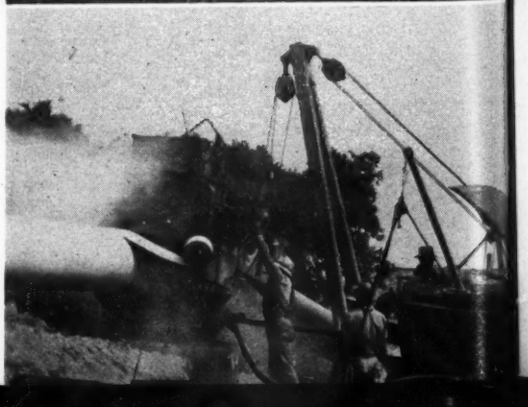
Fourth and largest loop on the construction program extends from Otoe county, Nebraska, to Adair county, Iowa, a distance of 99 miles. Completion of this line is expected in November. Not yet under construction, the other loop is planned to originate in Mahaska county, Iowa, and terminate 83 miles northeast of that point in Muscatine county, Iowa.

A special construction feature of the project is the use of fabricated pipe bends. The A. O. Smith Corp. has been issued contracts for the manufacture of the pipe and bends and the Cooper-Bessemer Corp. will furnish the compressors. The electric-welded pipe will be protected by Wailes Dove-Hermiston Corp. bitumastic primer and enamel and a spiral wrap of kraft paper.

River clamps in place. Sand points are used for dewatering the extra depth trench.







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AT RIGHT, TOP:
Merco automatic valves and bypass connections.

CENTER:
The cleaning and priming machine.

BOTTOM:
Paint machine approaching 11° overbend.

▼

REGULATION OF GAS HOLDERS IN CALIFORNIA

A Gas Holder Purging Apparatus

By HARRY J. KEELING

Southern Counties Gas Co., Los Angeles, Calif.

GAS, in its September issue (pages 32-36), presented three papers on the regulation of gas holders in California. These papers, by Arthur B. Allyne, of the California Railroad Commission; M. R. Thompson, vice president of Southern Counties Gas Co., and Hughes Sneed, of Oakland, Calif., dealt with the results of the first year's operation under the California State Railroad Commission's General Order No. 94, which governs the inspection and maintenance of gas holders. In this issue the three papers herewith presented by Messrs. Keeling, Millner and Anderson describe procedures and apparatus developed for the safe purging of holders for the purpose of inspection and/or repairs. All three papers were presented before the Annual Convention of the Pacific Coast Gas Association in Del Monte, Calif., September 10-12, 1941.—Editor.

EARLY in 1940, Southern Counties Gas Co. of California completed the construction of the first of a series of new high-pressure holders. The necessity of purging these holders in order to place them in operation, and the new Railroad Commission General Order 94, effective April 1, 1940, increased materially the use we would have for purging equipment. It was apparent that a specially built portable purging apparatus would be desirable in place of using our previous methods. We therefore designed such an apparatus and completed its construction by March, 1940.

Fig. 1 shows the general appearance of the completed purging apparatus, and Fig. 2 the constructional details. It consists of a water-cooled combustion chamber mounted on a trailer with a gas-engine-driven rotary compressor supplying the air required for combustion. This equipment was designed to purge a 500,000 cu. ft. holder in seven hours, assuming that the volume of inert gas required is twice the holder volume. The purging apparatus delivers about 48,000 cu. ft. of flue gas per hour, and requires for its operation about 4400 cu. ft. per hour of natural gas, 52,000 cu. ft. per hour of air, and 450 gals. per hour of water. The mixture of inert flue gas and steam passing into the holder amounts to 135,000 cu. ft. per hour. A typical analysis of the flue gas is:

CO_2	11.1%
O_2	0.3%
CO	0.0%
N_2	88.6%

The main body of the trailer is taken up by the combustion chamber (48 in. diameter, 10 ft. 6 in. long) and the surrounding water drum (69 in. diameter, 11 ft. 4 in. long). A second-hand trailer 16 ft. long was used, and the frame length was increased by 4 ft. so as to make the bed 20 ft. long. The front deck, on which is mounted the engine and air compressor supplying the burner, is 7 ft. 6 in. square. The gross weight of the complete apparatus is 16,000 lbs., and the net weight of the equipment mounted on the trailer is 12,600 lbs. with the drum filled with water ready for operation. If the trailer is to be moved over public highways, the water in the drum, weighing approximately 7600 lbs., is removed.

The combustion chamber was designed to be operated completely inclosed under a pressure of about 1 lb. per sq. in. All the air required for combustion is supplied by an 8x20 Connersville rotary compressor driven by a one-cylinder air-cooled engine operating on natural gas. By operating the combustion chamber under pressure, it is permissible to use relatively small diameter piping between the purging machine and the holder. This reduces materially the expense involved in installing and removing the piping each time the equipment is used. Since all the air for combustion is supplied by the rotary compressor, the gas to air ratio of the mixture entering the burners is easily controlled. The compressor is equipped with a tachometer, and constant speed is maintained through the engine governor. Fig. 3 shows the burner end of the apparatus, and Fig. 4, the discharge end.

The gas supply to the burners is controlled by an Emco 1001 regulator which is mounted on the trailer frame and may be seen in Fig. 1 just to the right of the ladder. The outlet pressure of this regulator is controlled by the pressure in the combustion chamber near the discharge end. With this arrangement, a constant gas-air ratio is maintained over a wide variation of firebox pressure.

The gases discharged from the combustion chamber are cooled by means

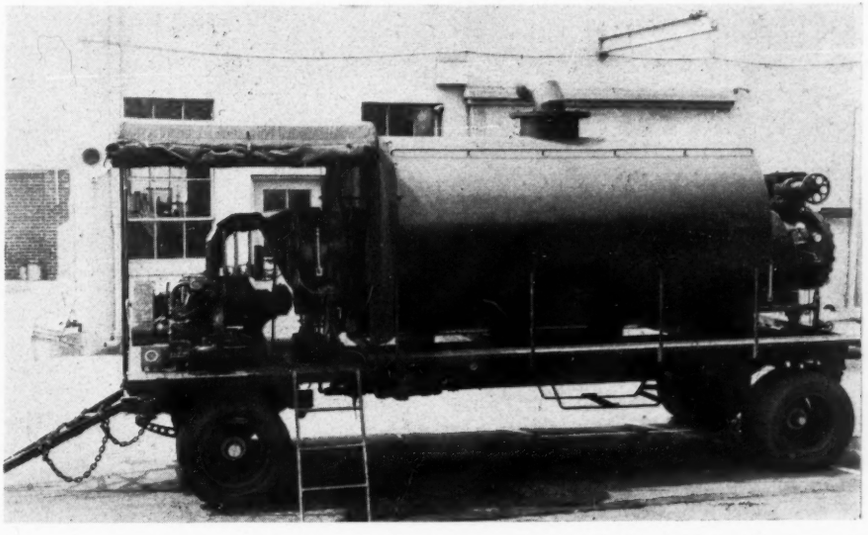

FIG. 1. General view of complete holder purging apparatus as seen from operating side.

of a water-fog spray nozzle mounted in the neck of the combustion chamber near the discharge connection. Excess water from the fog nozzle is carried away from the combustion chamber neck through an overflow trap constructed from 2 in. pipe. The neck of the combustion chamber is tapered so that the water flows away from the combustion chamber toward the overflow connection. Any water that is splashed into the combustion chamber itself is drained by means of a trap connection at the lowest point. The combustion chamber is entirely surrounded by water to prevent overheating. The steam produced in the water drum is discharged through a 10 in. vent at the top. A 10-ft. length of light-gage galvanized iron pipe is used to conduct the steam away from the apparatus and to prevent accident due to hot water being blown out. A constant water level is maintained through an over-flow connection in the end of the water drum near the rear of the trailer, and the rate of flow of the make-up water is adjusted so that a small overflow is discharged to the waste pipe. A water level gage is mounted in the burner end of the water drum so that the operator will be informed of the water level at all times.

The piping on the purging apparatus was designed to simplify as much as possible the work in making the connections when the machine is delivered to the job. A 2 in. connection is provided for the gas supply, and a built-in dust filter and regulator are permanently mounted on the trailer frame. All other gas connections and control lines are permanently installed on the trailer so that only a single connection to the gas supply need be made. Similarly, 1½ in. inlet and 6 in. outlet water connections are provided at the rear of the trailer, and all the water piping required for the operation of the apparatus is permanently connected to these lines. The water supply to the trailer connections is provided through a fire hose, and special light-gage galvanized iron pipe with "driven" joints is used to conduct the waste water away from the machine. The connection to the holder is made through the 8 in. gate valve on the side of the firebox neck, locat-

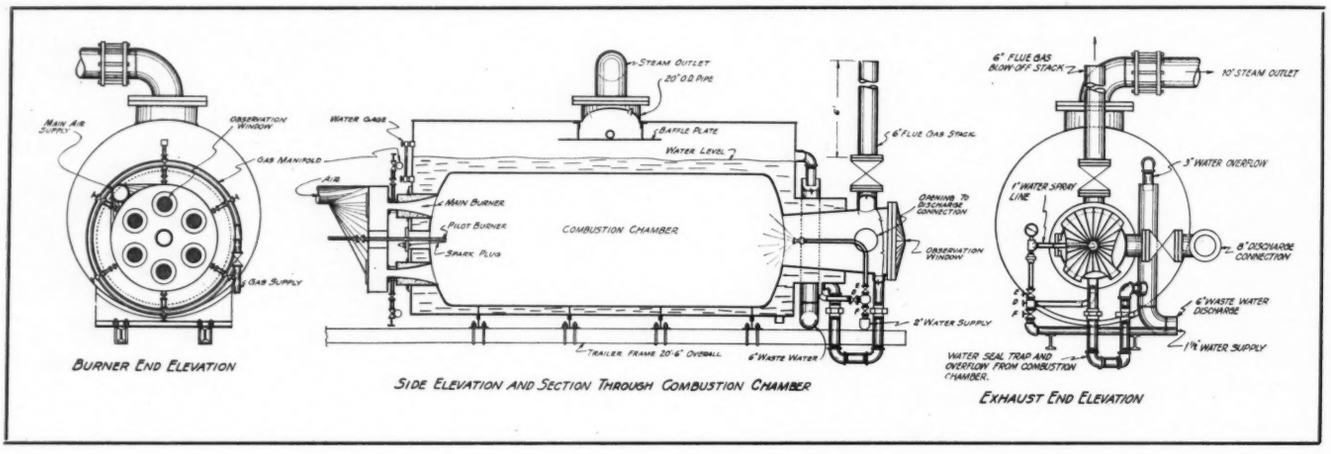

FIG. 2. Constructional details of purging apparatus combustion chamber.

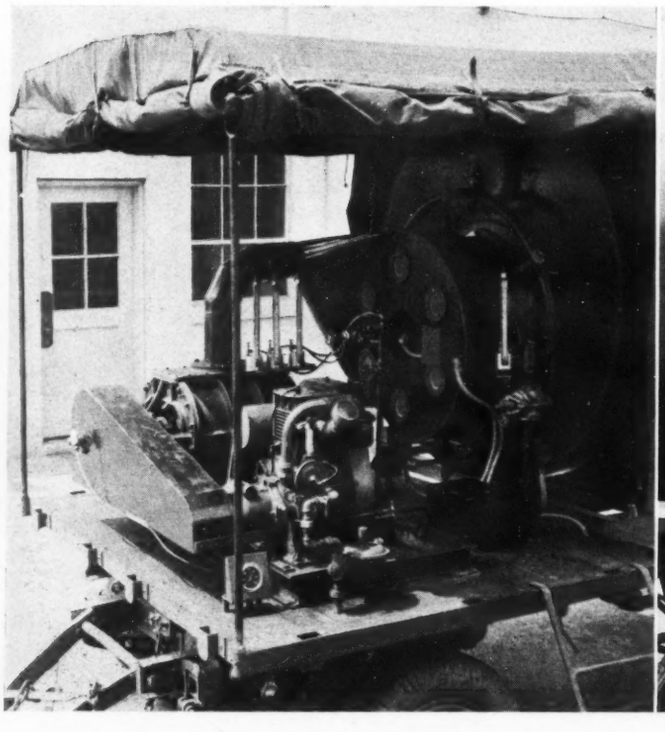

FIG. 3. View of equipment on platform at burner end of purging apparatus. The tachometer is to the left of the gas engine.

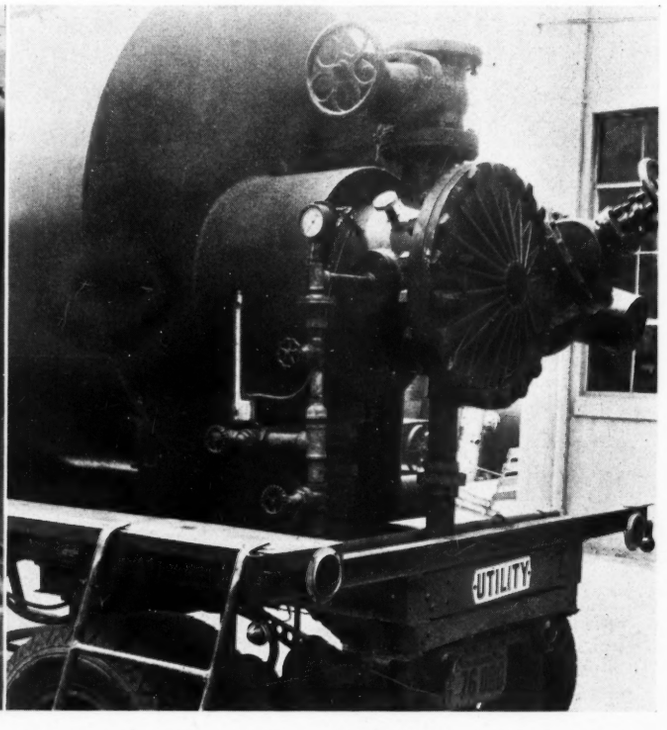

FIG. 4. Discharge end of purging apparatus, showing water spray controls and connections, temperature and pressure gages.

ed at the rear of the trailer. This connection was purposely made rather high so that water condensing in the discharge line would flow toward the holder where it is drained through a water seal trap. A loose-ring 8 in. elbow constructed of light-gage steel attached to this valve permits adjustment of the angle of the discharge line. The inert gases are carried to the holder through a light weight 8 in. diameter pipe line consisting of 10-ft. lengths of pipe with "driven" joints.

Light weight flanged elbows, driven elbows, and various conversion fittings are carried on the platforms and racks provided on the trailer, and since this "driven" pipe has the same outside diameter as standard steel pipe, connection can be made to any standard pipe in a very short time, by using Dresser couplings. A total of 60 ft. of light weight pipe, together with the various elbows, fittings, etc., may be carried on the trailer in addition to the steam piping, blow-off stack, and other necessary equipment.

Six burners, arranged in the form of a circle with a pilot in the center, are mounted in the forward end of the combustion chamber. The burners themselves are ceramic-lined cast iron pots about 8 in. in diameter. The throats of the burners are about 3 in. in diameter. The air is distributed to the burners by a circular, sheet metal manifold, which opens directly into the ends of the burner castings. Glass observation windows are provided in the air manifold so that the burner flame may be observed through the rear of the burner itself.

Gas is distributed to the six burners through a circular manifold constructed of 1½ in. pipe with individual cocks and control valves on each burner. The gas is introduced into the burner through a series of narrow slots between the burner casting and the ceramic lining. There are no dampers or controls in the air supplied to the burners. This construction permits operation of the combustion chamber a very small pressure drop through the burners; therefore, most of the pressure delivered by the compressor is available for overcoming the resistance of the piping between the purging apparatus and the holder.

Direct reading mercury manometers are provided for the guidance of the operator to indicate air manifold pressure, combustion chamber discharge pressure, pilot air and gas pressure, and burner gas pressure. The operator is informed of the rate at which air is being delivered to the air manifold by means of a tachometer connected to the compressor shaft. A glass observation port mounted in the cast iron cover closing the discharge end of the combustion chamber allows the operator to examine the pilot flame or burner flames, and also shows the water spray. The discharge temperature of the flue gas is indicated by a Weston temperature gage mounted in the wall of the combustion chamber discharge neck.

The purging apparatus design included devices to minimize the danger of overheating or explosion in the combustion chamber by shutting down the gas supply if a hazardous condition exists. In this way, only a limited amount of supervision is required by the operator.

The complete cost of the purging machine with the necessary connecting piping, special fittings, attachments, etc., is given below:

Four-wheel, six-ton used trailer with eight tires, brakes, lights, etc., including lengthened frame, special platform and stake holders	$ 390.00
Compressor and engine, etc.	852.00
Combustion chamber, water drum, supports, installed on trailer	788.00
Six special burners, installed	305.00
Piping and control materials	1084.00
Labor	523.00
Auto and tool expense	187.00
Management expense	168.00
TOTAL COST	$4297.00

Holder Inspection and Purging

By BYRON MILLNER

Pacific Gas and Electric Co., San Francisco, Calif.

ON April 1, 1940, and effective of that date, the California Railroad Commission issued General Order No. 94 which covers the internal and external inspection of waterless holders, water seal holders, high pressure holders and hydrocarbon vessels.

To comply with the requirements of this Order, special equipment for inspection and purging was necessary for this work so that all questions in the forms could be answered.

EQUIPMENT

Following is an itemized list of the equipment and tools used by the Pacific Gas and Electric Co. in carrying on the inspection work. These items are also shown in Figs. 1, 2, 3 and 4.

FIG. 1.

A. 20,000 cu. ft. per hour gas fired inert gas generator with 220-440 volt motor driven auxiliaries.
B. A 1½-ton truck with specially constructed body.
C. Three gas regulators.
D. Sixty ft. of 6-in. slip joint steel pipe. Light weight 1/16-in. wall.

FIG. 2.

A 20 000 cu. ft. per hour inert gas generator.
A. Natural gas rotary pump.
B. Air rotary pump.
C. Manufactured gas rotary pump.

FIG. 3.

A. Steam purge indicator.
B. Copper still—(Designed by M. A. Richford, PG&E Co.)
C. Portable pH indicator with two color discs.
D. Transit with additional special top mounted telescope for plumbing holder columns.
E. Boilermaker's micrometer.
F. Special scraping tool for use with boilermaker's micrometer.
G. One set of micrometer gages.
H. A 25-lb. dry powder fire extinguisher.
I. Two ½-lb. dry powder fire extinguishers.
J. Two 1-in. rotary hack saws equipped with coupon catcher.
K. Two combustible gas indicators.
L. Orsat.

FIG. 4.

A. A 2000 cu. ft. per minute portable gasoline engine driven air blower, static pressure 3 in. W.C.
B. Fifteen ft. of 12-in. diameter canvas air pipe.

ADDITIONAL EQUIPMENT AND TOOLS USED WITH THE INERT GAS GENERATOR

1. 150 ft. of 6-in. No. 22 gage galvanized iron drain pipe.
2. 400 ft. of ⅛-in. seamless aluminum tubing.
3. One 6-in. quick opening flanged gate valve.
4. One 6-in. Dresser coupling.
5. Three enameled steel "No Smoking" signs.
6. 100 ft. approved electric extension cord.
7. A ½-ton truck (carry-all suburban) with seating arrangement for three passengers.
8. Miscellaneous tools.

When there is a group of holders or where buildings are adjacent to the holders, it is practically impossible to plumb the holder columns with a transit but, if the transit is equipped with a special top mounted telescope as shown in Fig. 5 and the transit can be set up at a distance of not less than 10 ft. from the tank walkway, all columns can be plumbed.

The purchase of this equipment involved an expenditure of approximately $10,000. This amount was considered reasonable in view of the large

FIG. 1. View of inert gas generator and truck, showing the three gas regulators.

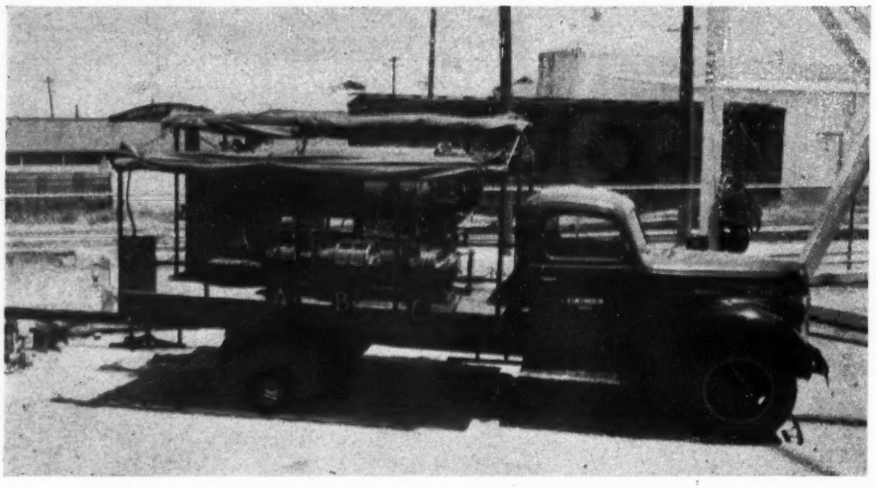

FIG. 2. View of inert gas generator and truck showing natural, air and manufactured gas rotary pumps.

number of holders to be inspected and to have the proper equipment for obtaining the information necessary to answer the questions in the holder reports scheduled for the year.

Considerable time is saved in purging a holder if four 3-in. vent pipes with gate valves are installed on the crown instead of one vent, which has been the practice in the past. One of the vent pipes is located in the center of the crown and the other three spaced 90° apart near the outer crown circumference, the central one of these being 180° from the point where the inert gas enters the crown. With this arrangement of vent pipes and with the aid of the crown supports, which act as deflectors, the inert gas is better distributed throughout the crown for removing the combustible gas. The vent valves can be regulated to maintain the 1 in. water pressure in the crown as recommended by the American Gas Association, and also to control the purging from any section.

The four 3-in. vent pipes with gate valves are installed on the crown by arc welding and after the removal of the circular steel discs from the crown by the use of the equipment for tapping gas mains the valves are shut off so as to retain the gas in the holder until the purging is started.

In order to facilitate the taking of gas samples from the vent pipes installed on the crown of the holder and the outlet from the inert gas machine during the purging period, it was necessary to install a ¼-in. jet pump so that a continuous sample could be had at any time for analysis.

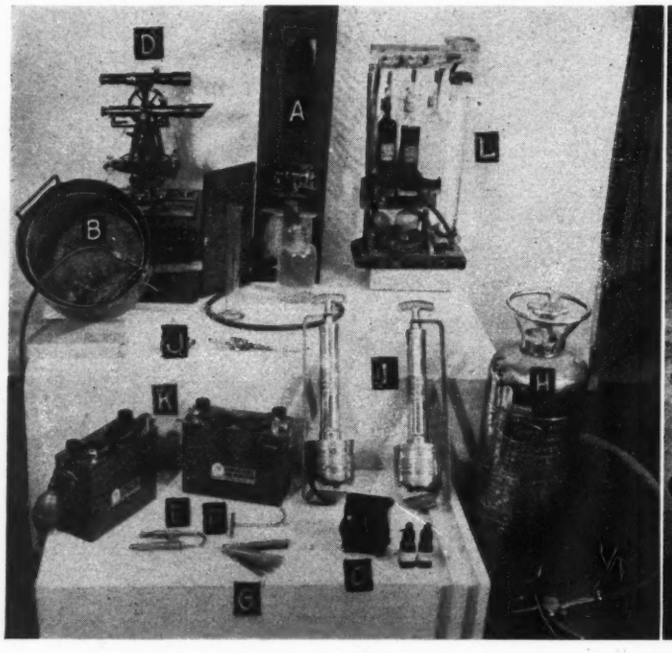

FIG. 3. Special equipment used by the company for holder inspections.

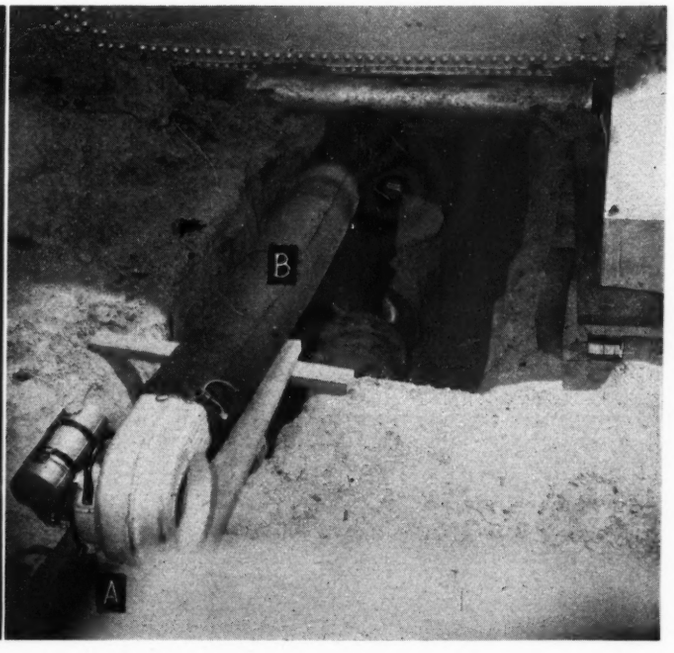

FIG. 4. Portable gasoline engine driven air blower, showing unit in operation.

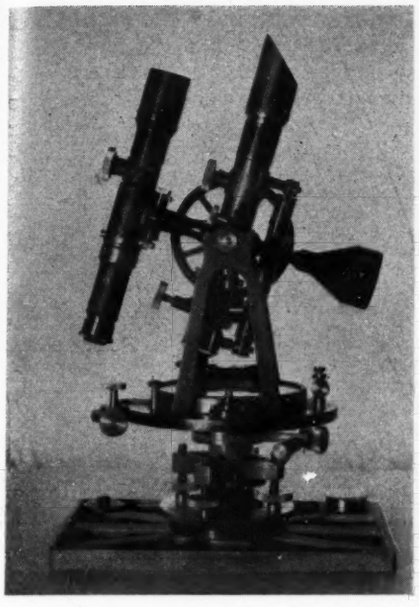

FIG. 5. Transit, showing a special top-mounted telescope.

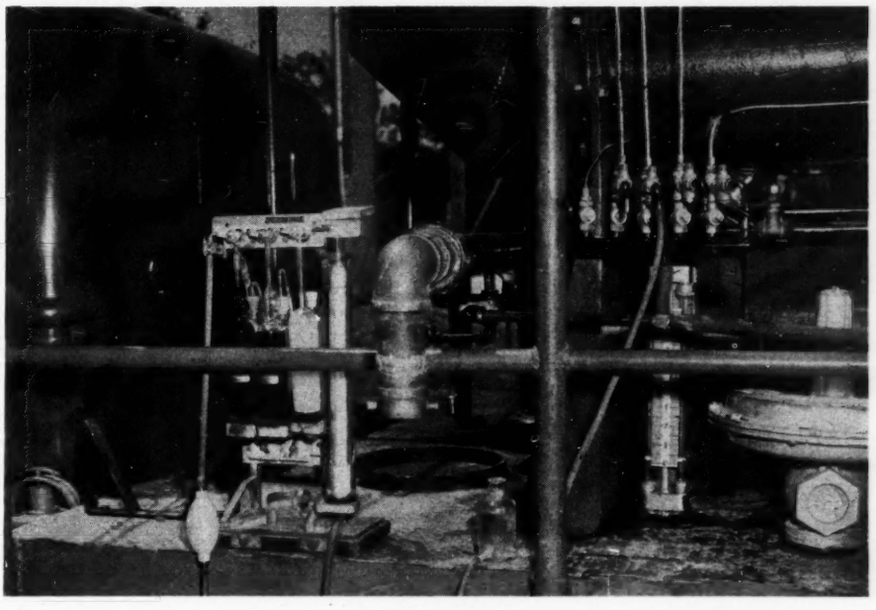

FIG. 6. Water jet pump and sampling header connections for orsat.

This jet pump is connected to a header that has six plug valves (Fig. 6) and from these outlets, ⅛-in. diameter seamless aluminum tubing is connected to the vent pipes on the holder and to the inert gas machine. A U-gage is connected to the header to indicate the vacuum which is controlled by the flow through the jet pump to produce about 6 or 7 in. of water column vacuum in the sampling lines. Plug valves and hose connections are installed on each sampling line near the header so that a sample can be taken from any line to the Orsat for analysis. The Orsat is used until the CO_2 gas content reaches 10 to 10½%.

The final purging of the holder is determined by using a combustible gas indicator. Two gas indicators are used so that one can be checked against the other during the purging period. The combustibles are removed to a point where the gas indicator shows a reading of .85 or less as recommended by the American Gas Association.

Conclusion: The company has in operation at the present time 54 low pressure and 22 high pressure gas holders as well as two hydrocarbon vessels that must be reported on each year. In order to report on these holders and vessels it was absolutely necessary to be fully equipped to handle inspections, purging and repairs to all gas holders and vessels.

Purging High Pressure Holders

By K. B. ANDERSON

Coast Counties Gas & Electric Co., Santa Cruz, Calif.

IN compliance with the California State Railroad Commission General Order No. 94 we recently purged and inspected 10 high pressure natural gas holders in our Southern Division. Five of the holders that were inspected were located at our Santa Cruz gas plant, (see Fig. 1), three were located at Watsonville and two at Hollister. These holders are approximately 6 ft. x30 ft. horizontal cylindrical tanks with dished heads.

The methods used in our purging operations were those recommended by the American Gas Association in its bulletin, "The Purging of Gas Holders." The equipment used consisted of a portable truck-mounted 120 C.F.M. Ingersoll-Rand compressor, driven by a four cylinder gasoline engine, the exhaust of which was used as the inert gas for the purging operation. A specially designed wash box for cooling the hot exhaust gases from the engine was set up near the compressor. (See Fig. 2.)

Two standard vents made of 3 in. pipe controlled with gate valves, provided with test nipples, and hose cocks for taking gas samples were constructed for the job. A 3 in. high pressure air inspirator with a No. 4 M.T.D. orifice supplied with compressed air at 80 lbs. per sq. in. pressure was employed to displace the inert gas from the holders and to maintain ample ventilation in the holders during the internal inspection. Gas analysis equipment consisted of a Hays portable Orsat apparatus and two J. W. combustible gas indicators.

The holders were prepared for purging by positively isolating them from the gas piping to prevent any possibility of the admission of flammable gas and the standard vents were erected on the outlets of the holders. When possible the holders were connected in series in sets of two and were purged as one holder. When one set of holders was completely purged with inert gas, the inert gas was admitted to a second set while the first was being purged with air. This procedure saved unnecessary operation of the compressor.

The compressor truck was placed in a convenient location near the inlet to the holders and the wash box was connected between the compressor exhaust line and the holder inlet. By means of the valves on the wash box and those on the inert gas line connecting to the holders, it was possible to exhaust the inert gas from the lower valve of the wash box until the proper quality of gas was obtained for the purging of the holders.

The compressor was loaded to 80 lbs. pressure and allowed to warm up while samples of the inert gas were taken and adjustments were made on the engine carburetor. A typical anal-

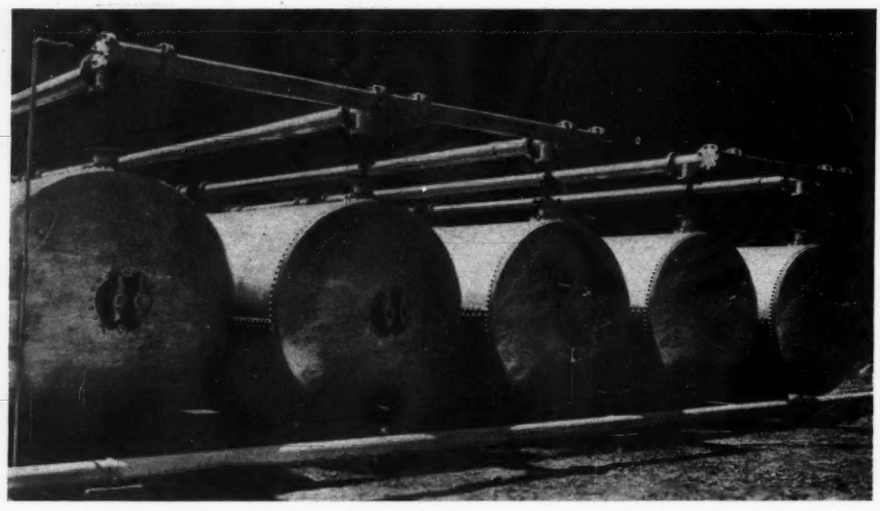

FIG. 1. Santa Cruz high pressure tanks, showing headers and manholes before inspection.

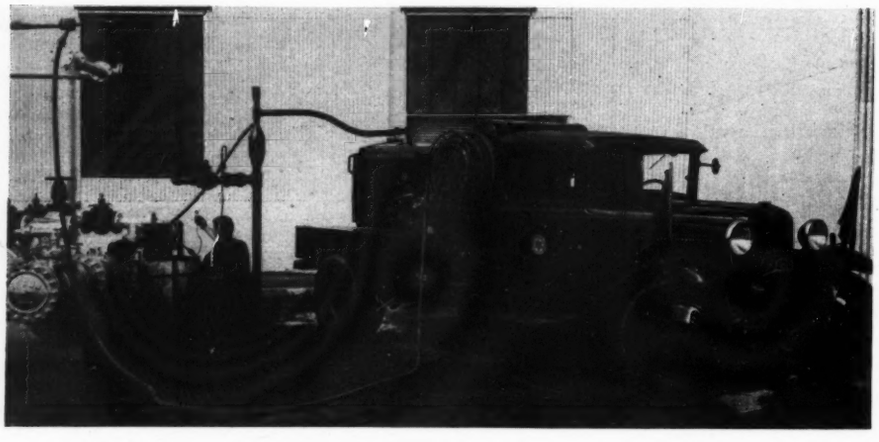

FIG. 2. Watsonville plant yard, showing compressor, wash box, inspirator, gas analysis apparatus and temporary piping.

ysis of the inert gas produced by the compressor engine showed a carbon dioxide content of 10.8% and an oxygen content of 1.2% with only slight traces of carbon monoxide. The combustible gas indicator reading was at 20% of the lower explosive limit which is considerably below the maximum of 50% specified in the A.G.A. bulletin. With two combustible gas indicators available, one of which had been carefully calibrated beforehand, we were able to use one as a standard and thus were assured of a reliable means of determining the explosibility of the inert and purge gases.

When an adequate supply of good quality inert gas was obtained, the holders were bled to atmospheric pressure through the vent and the inert gas was admitted to the holders. The small drain cocks on the bottom of the holders were opened wide. This allowed the heavier gases and volatile oils which had accumulated in the bottom of the tanks during their use as manufactured gas holders to drain off and also served as a precaution against by-passing the inert gas from the inlet to the purge vent.

Samples of the inert gas were taken at the wash box hose connection at intervals of one-half hour and analyzed with the Orsat apparatus and the combustible gas indicator. No adjustments to the engine carburetor were found necessary during the purging operation as the quality of the inert gas remained practically constant.

Samples of the purge gas from the hose cock on the vent were taken and analyzed every 15 minuites and an occasional sample of purge gas from the drain cock on the bottom of the holder was analyzed.

Purging with inert gas was continued for two hours or longer depending on the accumulation of volatile oils in the holder. Purging was discontinued when the vent gases were brought down to 50% of the lower explosive limit. The inert gas line was then removed from the holder inlet and changed to a new position on another set of holders. Here the purging operation was repeated.

The air inspirator was then connected to the inlet of the purged holders and was supplied with compressed air to displace the inert gas from the holders. After 15 minutes of air purging, the manhole cover at the vent end was removed from one of the holders. The air was made to flow through the holder from the inlet end to the manhole which was now used as an exhaust. The other holder was valved off to prevent any purge gas from entering the ventilated holder. When the holder atmosphere was analyzed and found to be free from all traces of inert gas, workmen were allowed to enter through the manhole with explosion proof extension lights and clean the interior preparatory to the inspection. After the inspection was completed, the manhole cover was replaced and the holder was ready to be repurged with inert gas before being returned to service as a natural gas holder.

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Kansas-Nebraska Co. Lowers Gas Rates in 18 Communities

A voluntary reduction of natural gas rates has been put into effect in 18 Nebraska communities served by the Kansas-Nebraska Natural Gas Co., Phillipsburg, Kan., following the filing of the proposal with the Federal Power Commission recently.

All gas consumed after the September readings will be affected by the new rate schedule which will reduce company revenues approximately $90,000 a year, said S. D. Whiteman, general manager of the Kansas-Nebraska Natural Gas Co. Reductions include retail rates in all communities in the state served directly by the company and Nebraska cities served by distributors buying gas at wholesale from the company.

Communities served directly in Nebraska, and to which the new rates will apply, are Chester, Hebron, Deshler, Davenport, Edgar, Clay Center, Sutton, Harvard, Trumbull, Kenesaw, Wood River, Shelton, Gibbon, Minden, Axtell, Funk, Holdrege and Giltner.

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Gas-Fired Magnesium Plant Completes Trial Operations

With the completion of trial operations at the new magnesium plant at Permanente Creek, near San Jose, Calif., large scale production will soon be under way. The first powdered magnesium produced has been cast into 369 pigs for shipment. Six hundred pounds of pure magnesium crystals were condensed in the first retort during trial operations, and the entire plant has completed its shake-down trial operations. Enormous quantities of natural gas are used in the cooling and other operations of the plant.

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Standard Oil Drills Wildcat

Standard Oil of California is drilling its second wildcat well in Yolo County, Calif., the well having reached a depth of 3000 ft. Successful completion of the test, either in oil or gas formations, would be of importance in proving up a new gas field in northern California.

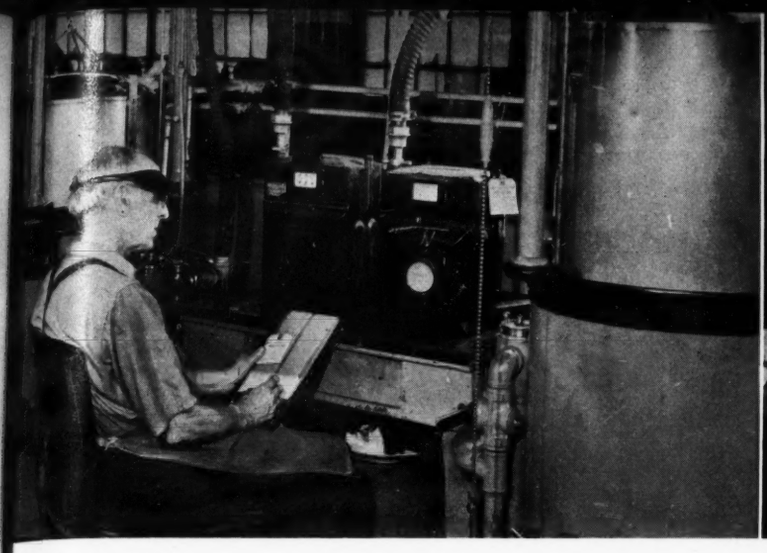


FIG. 1. James Weidman makes initial tests of incoming meters.

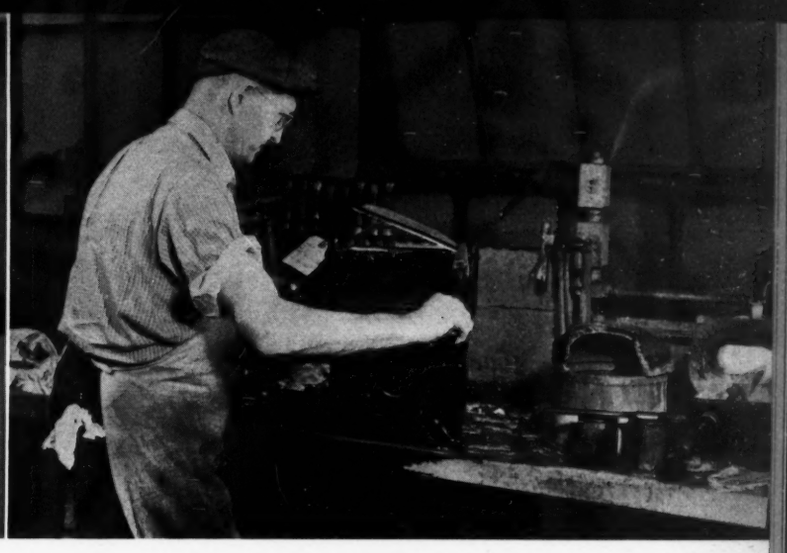


FIG. 2. Richard Jurmis opens meter for further inspection.

THE CAMERA

Follows A Meter Through the Shop

THIS treatise on meter shop practice must necessarily deal with the characteristics of the meter repair practices of the Michigan Consolidated Gas Co. in Detroit developed as a result of experiences of the past and expected future needs. The accompanying illustrations and diagrams make more vivid some of the details of the shop procedure.

Fig. 1 shows an operator making the initial test on incoming meters. The provers are provided with standard gauges and hose connections. The mountings for the pulley and counterbalance support have been rebuilt wth dust proof ball bearing mountings and the action of the prover bell, up and down, has been greatly improved. The provers are raised with air from a 2-lb. air line. This air has been hydrated with steam to a point of saturation where the wet bulb depression does not exceed 4° F. The meters are tested at standard rates, i. e., 30 c.f.h. for the 5 lights, 60 c.f.h. for the 10 lights, etc.

After the meters have been given their initial test the separation into repair classes is made. Essentially, these are as follows:

Class A: Meters having a service period of 72 months or less and found to be within the proof limits: 0.0 to 2.0% slow. These meters are painted and retested.

Class B: Meters having a service period of 72 months or less and found to be out of proof. These meters are topped-off, tested for tightness of the packing boxes and backplate seams, readjusted, topped in, painted and given a final test.

Class C: Meters have been in service more than 72 months. These meters have the top and backplate removed, diaphragms re-oiled, are fitted up, and then follow through the same repair path as the Class B meters.

Class D: Meters having faulty diaphragms are stripped to the center partition, given an oil bath and rebuilt with new diaphragms. These then follow through with the Class C repairs other than re-oiling.

A description of these details follows as the repair cycle is discussed. Fig. 2 illustrates a workman removing a meter top.

Fig. 3 presents the apparatus used for testing a meter diaphragm for tightness. The air pressure (4 in. water column) is applied in the usual manner through the diaphragm ports of the meter. As the valve to the air supply is shut off an electric circuit is closed which, at the end of seven seconds, will turn on a small electric light bulb. If, during this seven seconds, the pressure in the diaphragm compartment has not dropped more than 1.4 in. it is conceded that the diaphragm leak will in no way affect the proof. With the average operating differential of a meter being (less than 0.1 in.,) the flow across a pin hole leak in a diaphragm is negligible. Examination of several hundred meters showed that no failure at the four-pointing test was traceable to the minute diaphragm leaks. In addition to saving a few diaphragms this process entirely eliminates the need for judgment on the part of the operator making the test and it is of primary interest for this reason. In a desire to find the ultimate end point for non-proof affecting leaks, a drop of 2.0 in. in seven seconds has been permitted for some time, and as yet no meter has been found at the four-point bench where failure could be traced to the diaphragm leak.

A meter diaphragm and dressing theory which have been behind the diaphragm program for the past eight years materially affects the oiling process as carried out in Detroit. It is felt that the use of a firm leather for a meter diaphragm will avoid much of the distention and collapse of small wrinkles which takes place in the lighter leathers as the diaphragm works in and out. In general, a diaphragm which the trade considers a standard weight for the 10 light meter is used for all 5 light meters in Detroit, and the larger sizes are correspondingly increased in firmness. Coupled with this firm leather a diaphragm dressing is used which will in itself add some rigidity. The formula contains approximately 1½

BY ROUTINE procedure, every meter in service is brought into the meter shop of Detroit's Michigan Consolidated Gas Co. for a check-up at least once every 10 years. If tests show accuracy outside very narrow limits (0 to 2% slow), the meter is torn down, re-diaphgramed if necessary, repaired, repainted, and restored to complete accuracy. The rebuilt meters are then good as new, ready to go back into service. The photographs and drawings on these pages depict pictorially the procedures followed in the Michigan Consolidated meter shops. Author of the article is A. V. BRASHEAR, superintendent of meters, and this contribution to GAS is furnished through the courtesy of HENRY FINK, assistant general manager.

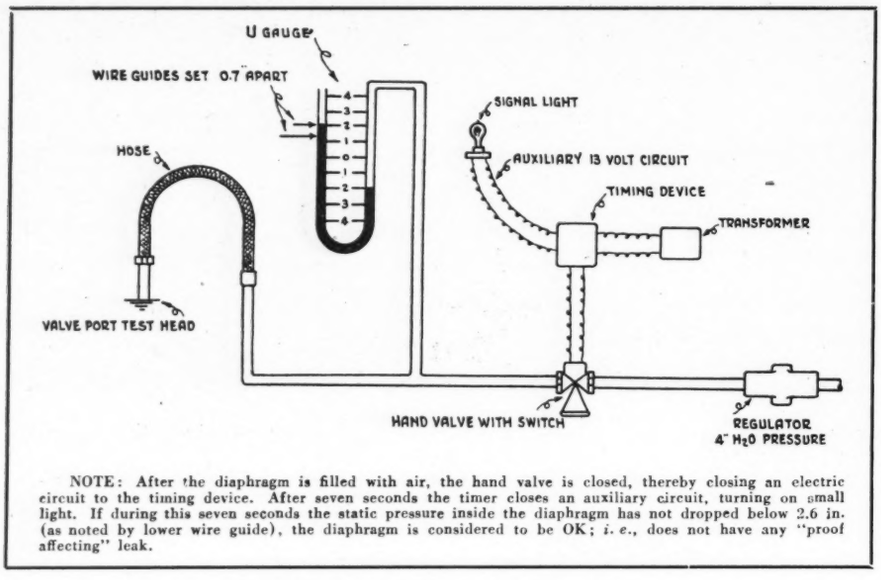

U GAUGE
WIRE GUIDES SET 0.7 APART
HOSE
VALVE PORT TEST HEAD
SIGNAL LIGHT
AUXILIARY 13 VOLT CIRCUIT
TIMING DEVICE
TRANSFORMER
HAND VALVE WITH SWITCH
REGULATOR
4" H2O PRESSURE
NOTE: After the diaphragm is filled with air, the hand valve is closed, thereby closing an electric circuit to the timing device. After seven seconds the timer closes an auxiliary circuit, turning on small light. If during this seven seconds the static pressure inside the diaphragm has not dropped below 2.6 in. (as noted by lower wire guide), the diaphragm is considered to be OK; i. e., does not have any "proof affecting" leak.

FIG. 3. Meter diaphragm test apparatus.

lbs. of paraffin and 1½ lbs. of beeswax for every gallon of a neutral mineral oil and the mixture is balanced so that the solidifying point is at 100° F. The use of this heavy oil precludes oiling through the diaphragm ports as the channels would be partly closed by the oil coating. This made it necessary to remove the fronts and backs of all meters to be oiled.

After three years of operation in this fashion, experiments proved that the diaphragms could be oiled as satisfactorily by drilling holes in the meter bottom, submerging the meters in the oil and allowing them to stand for a certain period. The meters are inverted in a jig on a standard drill press and a ¾-in. hole saw is used to cut holes on each side of the partition near one side of the meter. The piece that is cut out either bends up inside of the meter or falls harmlessly to the meter bottom where it sticks in the oil. The paint around the ¾-in. hole is scraped off by a small circular wire brush attached to the hole saw. Punched discs of tin slightly larger than the hole are purchased for patching these openings. Fig. 4 shows the oil tank in operation with four 5 light meters submerged in the 130° oil, three 5 lights on the rack-et end draining out and the operator wiping the surface oil off a meter at the back of the tank. Very definite timing is used for various size meters in order to prevent oil in any quantity

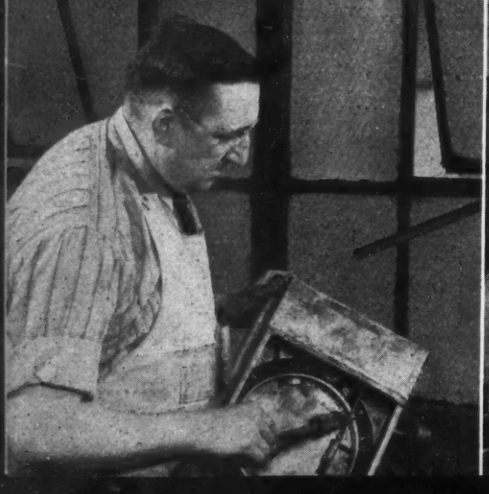
FIG. 4. Claud Hilligos wipes the surface oil off a meter that has been submerged in the oil tank.

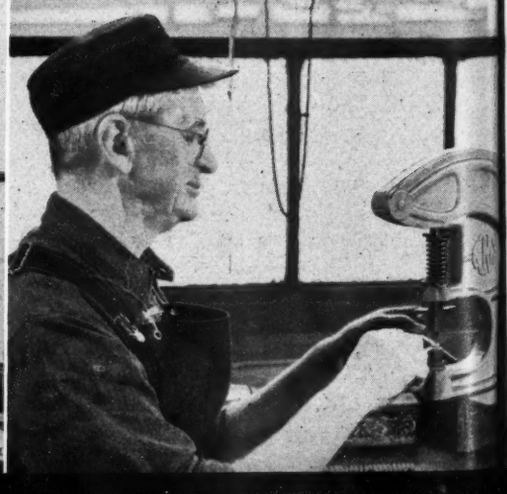
FIG. 5. James Ross rinses a meter after the paint has been removed in the caustic tank.

FIG. 6. John Bartkowick replaces faulty diaphragms.

FIG. 7. Peter Tromza fits valves and moving parts.

FIG. 8. Peter Van Dyke repairs and replaces faulty parts.





reaching the inside of the diaphragm.

Fig. 5 pictures a workman rinsing off a 5 light meter after the paint has been removed in the caustic tank just behind the operator. After the rinsing, these meters and parts are hand washed with soap. This removes any deposit resulting from the lye bath.

The re-diaphragming work presents little in the way of novelty. This seems to be a good place to mention the fact that guide wires are taken out of all meters. This has been the practice since 1933 in the 5 and 10 light sizes and since 1937 in the 20, 30 and 60 light sizes. As yet, there has been no evidence of any inaccuracy or failure on the part of any meter because of the removal of the guide wires. As designed, the guide wire was intended to insure that the disc movement in and out was parallel to the partition in the meter, but the relative weakness for any size meter has meant that the guide wire gave way and the diaphragm went where it pleased. The only noticeable effect that this useless part has on a meter's operation is to increase the differential where the diaphragm and guide wire buck each other. The removal of this part has also eliminated some noisy meters. Fig 6 shows a workman putting the diaphragm in a 5 light meter.

Before the meters are fitted with valves and repacked, the stems are all checked for level and if the stem faces are out of line they are all cut to a plane parallel with the meter bottoms. A small bench drill provided with an end cutter and center guide is used for this operation. It is shown immediately behind the workman in Fig. 6.

Two fitters are shown in Fig. 7 repacking and fitting up the meters. The packing is done with soft felt washers.

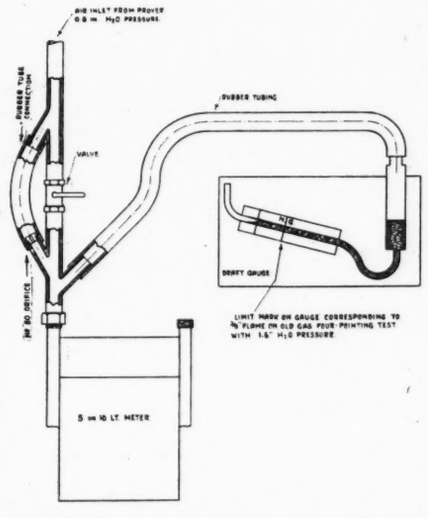


FIG. 9. Four-pointing gauge and valve set-up.

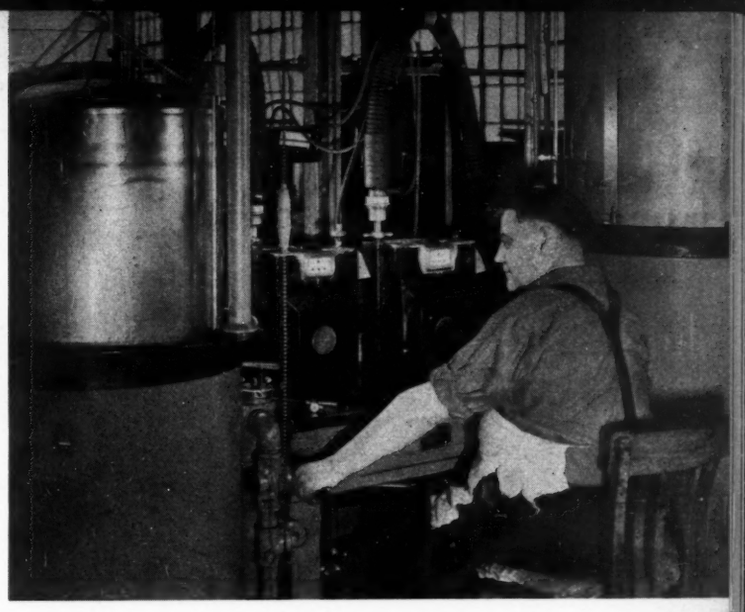


FIG. 10

Walter Byrne makes final adjustment of repaired meter.

These are cut on one side to facilitate placing them. The washers are impregnated with a graphite grease which is insoluble in water or any oils which may be in the gas. This packing is loose enough to permit the flag rods to drop when raised to the clearance of movement and yet it will hold a 2½ lb. air pressure on a submersion test. This packing is a big factor in lowering a meter's differential. It is of so little resistance to the meter's movement that a pure grease packing will only reduce the differential 0.01 in. water column more. A great many new parts have been placed in meters passing through the repair shop during the last nine years. This, plus the use of better bearing metals, has greatly reduced the lost motion factor on incoming meter proofs. This replacement also includes cranks and crank arms. In setting the valve the valve cover is centered on the seat as the diaphragm stroke is reversed, i.e., the tangent points to or away from the flag arm rivet. This synchronizes the opening of the valve ports with the reversal of the diaphragms and minimizes any pressure surge as interpreted on the differential gauge.

Incorporated in the fitting up job is the removal of all clicks. This was made possible by sealing all meters on the rigid connection, and it is felt that this has been a factor in reducing meter noise and reducing the number of stuck meters coming in for repair. It has been five years since this move was made, and there have never been any findings to indicate that the clicks have been needed.

Closely paralleling the fitting up work is the part repair illustrated in Fig. 8. The flag arms are repaired by punching out the old rivet, rebuilding the arm with a new short link and an oil bearing bronze bushing, and a new brass rivet. The clearance between the eye and the bushing, averages 0.003 in. and all arms are tested for freedom of movement. A brake machine with special fixtures is used for this job. The king posts are repaired by enlarging the old hole and by installing a phosphor bronze bushing; the press fit being tight enough to hold them in place. New posts are also run on to all tangent bars and the clearance between this part and the short flag arm eye also averages 0.003 in.

After the fitting up and the submersion test for leaks, the meters are four-pointed, using a prover counterbalanced to have an 0.8 in. outlet pressure. Fig 9 shows this layout. The four-pointing is done on four positions with the tangent pointing approximately toward the meter corners. With the valve open the compartment fills and the pressure in the slope gauge moves up to the zero point. The valve is then closed, and if there is not any leak, the gauge liquid will not move. If there is a leak there will be an air flow

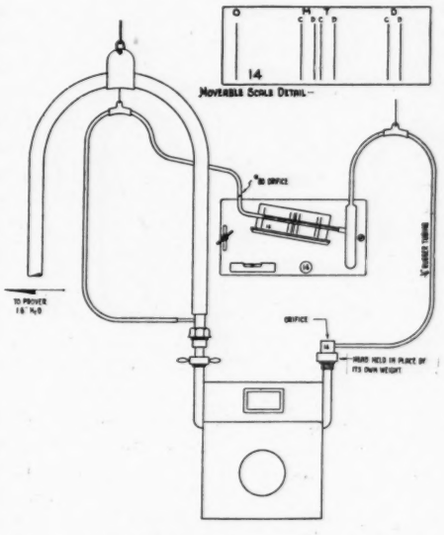


FIG. 11. Differential gauge set-up for adjuster's bench.

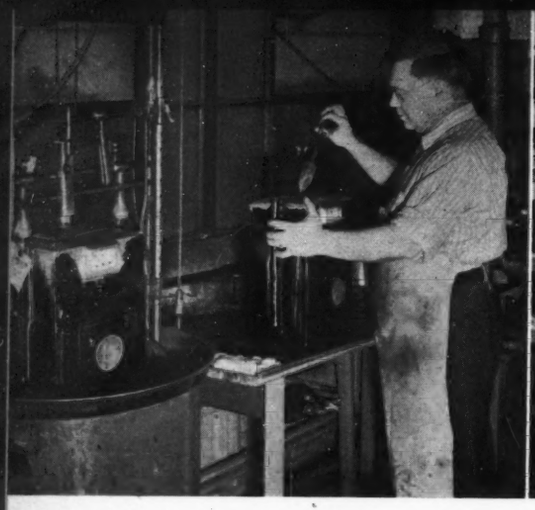


FIG. 12. William Thompson top sealing and testing.

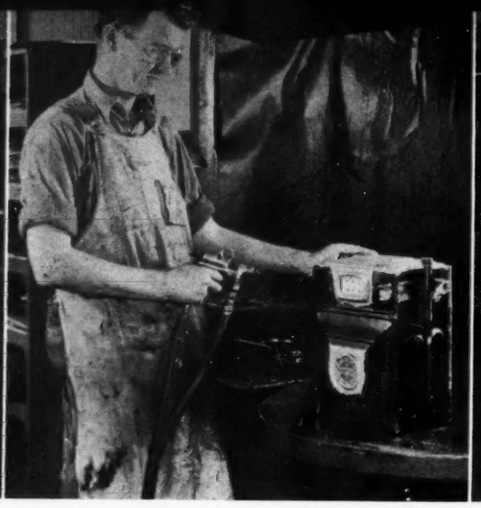


FIG. 13. Verl Firestone paints meters black with a spray gun.

FIG. 14. David Lloyd and Charles Nickerson load repaired meters.

through the by-pass around the valve, limited by a No. 80 orifice inserted in the by-pass. If, with this makeup air, the gauge pressure does not drop below the right hand mark on the slope gauge scale in three seconds, the meter leak is considered insignificant and the meter is passed. The scale divisions, orifice sizes and inlet pressure are relative and are balanced to conform to the old standard of permitting a small bead of flame when the test was formerly made with gas. The theory behind the low inlet pressure is that the diaphragm will not be subjected to any high differential and suffer from a semi-permanent stretch which may show continued recovery even after the meter is adjusted. Such recovery will make the meter run faster than the adjustment proof.

Fig. 10 shows an operator adjusting meters. This operation is carried out with a normal run of 75 c.f.h. and the regular open run. This, coupled with the preliminary half-foot observations, has speeded up the process. All tangent posts are set to a gauge measure for every make and size of meter and the operator is permitted to carry the bat, either in or out, one complete thread from this average point. If the meter requires more of a movement, it is turned over to the foreman who invariably finds some part in the meter that needs correction or changing. At the same time that the meter is being given its normal runs a differential gauge is in constant observation across the connections. Again certain limits are imposed for every size and make of meter, and if the meter cannot be brought within the specified limits, it is again turned over to the foreman of the proving room who determines the cause for the high differential and arranges for its correction. A differential gauge is shown at the back of the picture in Fig. 10 and Fig. 11 gives a diagrammatic layout of the connections. Again the results must be interpreted by relative scale markings and orifices for any one particular gauge although a commercial slope gauge is used for the standard. The establishment of differential limits should be such that the bulk of the meters will pass through the shop without any return for correction, that the fluctuation should be at a minimum (from 0.01 in. to 0.05 in. for 5 light meters) and that the meter will return from service with approximately the same differential that it had when repaired last.

Fig. 12 shows the top and top testing operations. This top testing is done with one of the standard machines built by the meter companies. This picture shows that new index boxes have been placed on the meters. These boxes are the new style, having a metal to glass bond and they are being placed on all "B", "C" and "D" meters.

Meters are painted black with a spray gun in a standard ventilated booth. Fig. 13 illustrates this operation. The face of the meter is painted while lying on its back with both the badge and the index box glass covered with a weighted mask. Fig. 14 pictures the truck used for the wholesale delivery of meters to various ship districts throughout the city.

Fig. 15 pictures four special soldering coppers used at the Meter Shop. The upper right hand illustration is a special iron which is purchased in just this shape for removing cases and for reworking into the wedge shaped backplate iron and the rounded tinning iron shown at the left. The lower right hand picture illustrates an iron used for installing diaphragms and discs and it is reworked from the standard soldering copper.

Meter history records are kept at the Main Office in conjunction with the service and customers records. The office in the Meter Shop clears incoming or outgoing reports, proof records, personnel matters, etc., but does not maintain any permanent files on meters or their behavior.

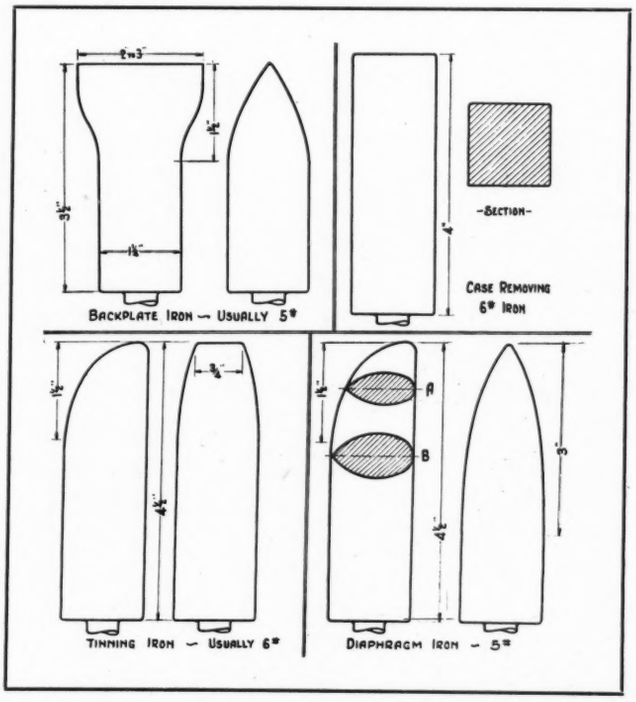


FIG. 15.
Four special soldering coppers used at the meter shop.

The Gold Seal Heating Plan

By CHRISTY PAYNE, JR.

Sales Manager, The Peoples Natural Gas Co., Pittsburgh, Pennsylvania

The Gold Seal Insignia.

CAREFULLY planned merchandising activities and policies are very important in any locality where the market for house heating has reached an acceptance stage which makes it attractive for exploitation by manufacturers, dealers and builders.

In many parts of a territory embracing 200 communities served by The Peoples Natural Gas Co., Pittsburgh, Pa., we found this exploitation taking place with both manufacturers and dealers prone to sacrifice quality and high installation standards in the interest of a more alluring first-price appeal.

Since much of this area is in the very heart of the bituminous coal region, with coal for house heating selling as low as $3.00 per ton delivered in the cellar, it became increasingly obvious that if the case for gas heating were allowed to rest on a price basis alone we would be faced with a serious decline in our house heating load.

Analyzing that phase of our load problem that we considered most directly influenced by the sale of heating equipment for new residential construction, we adopted a policy effective with the first of this year that represented a new departure from our long established practice of selling heating installations direct to new home owners and operative builders.

The reasoning behind this decision might be summarized briefly as follows:

1. The quality of merchandise and the standards of installation practice in house heating are the primary concern of the public utility, as the one organization interested most in the net result rather than the first cost of a heating plant.

2. To build to and insure the maintenance of these high standards required the active and enlightened cooperation of all factors in the building industry, architects, builders and heating contractors.

3. To obtain this cooperation it appeared advisable that The Peoples Natural Gas Co. discontinue the merchandising of heating equipment to new homes and devote the attention of its sales engineering staff to furthering the public acceptance of gas heat through engineering and promotional activities exclusively.

4. The engineering phase of this twofold activity should be devoted to laying down a set of winter air conditioning specifications that would raise the standard of winter air conditioning equipment and installations in our territory.

5. The promotional plan would be one designed to create an unquestioned standard of quality in the minds of the public, identified with a certificate indicating that both equipment and installation conformed to that standard. By so doing we aspired to take the emphasis out of price and place it on predictably satisfactory performance where we feel it rightfully belongs.

Taking these factors as the main considerations, we organized and launched our Gold Seal Plan early in 1941. Briefly the Gold Seal Plan is a winter air conditioning code combining the best available ideas and recommendations of acknowledged house heating authorities. All of the details regarding selection of equipment, sizing of equipment and installation standards are available to architects, builders, contractors and owners in the form of a booklet "Requirements for Gold Seal Quality Gas Fired Winter Air Conditioning Equipment Installations."

Manufacturers of equipment, to have their lines and models regarded as eligible for Gold Seal Quality installations, are asked to reasonably comply with the standards listed in the "Re-

The Gold Seal—insuring the installation of highest quality heating equipment—is prominently displayed in front of this new home in the territory served by Peoples Natural Gas Co. of Pittsburgh.

CERTIFICATION FOR FURNISHING AND INSTALLING GOLD SEAL QUALITY GAS FIRED WINTER AIR CONDITIONING SYSTEMS

To:

.....

.....

The following pertinent information is submitted with our proposal to furnish and install gas fired winter air conditioning equipment for the building to be constructed at .....

.....*according to plans figured with* .....

wall construction and .....

wall insulation and .....*ceiling insulation.*

UNIT PROPOSED

Manufacturer ..... *Series* .....

Type or Model .....

Nature of Guarantee .....

INSTALLATION PROPOSED

The installation proposed includes the delivery and installation complete of the unit and necessary controls; all duct work according to lay-out proposed; all electrical wiring, gas and water piping, and flue connections according to details of the proposal; and, upon completion, the cleaning of the inside of the unit and the making of all air delivery and temperature tests and adjustments to secure satisfactory distribution of air to all parts of the premises heated.

IT is hereby certified that the heating unit specified in this proposal is designed to furnish all of the four recognized functions of winter air conditioning, namely, controlled heat, controlled air circulation, humidification and air filtering; has an input capacity of.....Btu. per hour which is 1½ times (or more) the calculated Btu. loss per hour based on construction details of plans submitted and using heat leakage factors recognized by the American Society of Heating and Ventilating Engineers.

It is also certified that the unit specified will satisfactorily heat the building to a 70°F, inside temperature when the outside temperature is — 0°F.; will deliver at least one (1) cu. ft. of air per minute for each 100 Btu. per hour input capacity; is approved as a central heating plant by the American Gas Association and also is approved by The Peoples Natural Gas Company as having reasonably complied with their Gold Seal Quality requirements for such equipment.

It is hereby certified that the conditioned air will be delivered to the various spaces to be heated and returned to the unit through a complete system of sheet metal ducts designed and installed according to such minimum standards now recognized by architects, contractors' associations and national organizations, such as the National Warm Air Heating and Air Conditioning Association and the American Society of Heating and Ventilating Engineers.

It is also certified that the air distribution system, room thermostat, summer switch and other controls, flue connections, erection of the unit, electrical wiring, and gas and water piping will be installed in accordance with the lay-out proposed and reasonably comply with The Peoples Natural Gas Company Gold Seal Quality requirements for such installations; and that the entire installation will conform to local building and air conditioning codes and local fire department regulations, as well as the regulations of other bureaus or bodies having jurisdiction.

Signed .....

Title .....

Company .....

Address .....

Date .....

quirements" booklet; and to facilitate the listing of those models which are eligible, a Manufacturer's Information questionnaire has been distributed to leading builders of gas fired equipment, and is available to any other manufacturers who are interested in supplying equipment of the quality specified.

Eligible manufacturers are then furnished copies of a Certification of quality of equipment which are to be filled in and given to the heating contractor upon his purchase of that equipment.

For the guidance of both contractor and home owner, sample heating specifications embracing the terms of a complete Gold Seal installation are furnished to both owner and architect. If the installation is made according to the specifications the heating contractor may then furnish the owner an Installation Certificate, which, with the Manufacturer's Certificate serves in a sense as a guarantee bond of Gold Seal Standards. The organization and procedure within our company whereby the details of the Gold Seal plan are carried out are similar to non-merchandising sales promotion departments in other operating utilities.

The New Building Division operates directly under the Sales Manager, and consists of the Chief Heating Engineer and six district Heating Engineers. The work of this staff is to contact architects, builders, equipment manufacturers and heating contractors. In addition to the good will or promotional work that they do for gas as a fuel, they also check heating layouts, upon request, and when jobs are completed inspect and report on them as to their eligibility for the Gold Seal rating. It should be noted that these engineers do not figure plans for contractors, nor do they verify in advance contractors proposals as to whether they meet Gold Seal Quality standards.

No specific lists of equipment are published as having conformed with the required standards, and any inquiries about specific equipment are referred to the manufacturer.

Reports Received Daily

The New Building Division relies to a large extent on the advance information supplied through Dodge Reports, as to projected construction activity, both for owner occupancy and for operative building. As these reports, which are supplied to us daily for our entire territory, are received, they are turned over to the Heating Engineers, each taking the ones where the buying influence is located in his own territory.

In the case of an architect-designed home for an owner, both owner and architect are called on. The first approach to the owner is through the medium of a personalized form letter, inviting him to use the facilities of the Division, and advising him that a representative will call on him within a few days. These letters are signed by the Heating Engineer concerned, and his home address and phone number are noted to facilitate and encourage residence conferences or calls outside of business hours. Since home building is essentially a matter that concerns the entire family we have found that the informality of this method is often productive of an attentive reception from both husband and wife that could not be hoped for in a call at an office or place of business.

The follow-up on a prospective installation is a matter that rests to a considerable extent on the judgment of the Heating Engineer. In some instances the architect is indifferent to the type of fuel to be used, and allows the matter to be decided entirely by his client, the owner. In other cases, however, the owner reposes complete jurisdiction in the architect for the selection of products and materials, and here the architect must be approached.

In the main it has been our experience that the pressure for an adequate installation must come from the top, with the owner as the key influence, followed closely by the architect. With heating contractors who have the reputation for specializing in quality work, we find little difficulty in enlisting active cooperation. Contractors, on the other hand, who estimate and install largely on a price basis are prone to offer few suggestions other than their willingness to install whatever the

specifications of the order call for.

While a continuous supply of information on individual homes to be built must rest in the main on the Dodge Reports Service, we have found it worth while to consistently call on and cultivate the operative or so-called speculative builder. Each concern in this classification controls the specifying of materials for dozens and sometimes even hundreds of houses, and it is not enough to wait until a job has been announced before starting to work on it as a gas winter air conditioning prospect.

Since the operative builder is concerned with constructing and selling at a profit, his interest in the heating plant is limited to whether it adds or detracts from the ready salability of his houses. We believe that through a wider advertising of the Gold Seal plan, a growing acceptance on the part of the public will make it an increasingly important factor in creating a more active market for houses heated according to its standards.

Public Acceptance Is Slow

This matter of public acceptance is a factor that must be developed slowly, and it is probable that its maximum effectiveness cannot be reached until other gas utilities in the general area served by The Peoples Natural Gas Co. become associated with the general promotion.

A pattern for this cooperation already exists in the Cooperative Advertising With Home Builders plan now operating under the joint sponsorship of the Natural Gas Companies serving the Greater Pittsburgh Area. Under this scheme the participating gas companies pay 25% of the newspaper advertising space cost of any builder who advertises homes meeting certain qualifications, i.e.: designed to use Gas for the 4 Big Jobs; priced at $10,000 or less.

Discussions have already been held with a view to developing a similar cooperative participation in the Gold Seal Plan.

While it is early to comment too fulsomely on the success of this operation we have had indications that the quality of heating installations in certain types of construction have already shown a marked improvement. And since our engineers approach each prospect from the standpoint of selling gas for heating, even though a Gold Seal job cannot be sold, there has already been an increase in the percentage of new residential construction using gas for heat.

We believe that we are building a substantial backlog of good will with the building industry as well as with home owners. In the case of the heating contractors, our voluntary withdrawal as an active competitor in gas-fired equipment is appreciated, and has resulted in our services being used in the capacity of consultants where heretofore it would have been impossible.

Another practical by-product of the Gold Seal effort is that we are building a complete house heating record of every new job that goes on our lines. Thus our service department in years to come will have the advantage of a ready file on the type, design, trade name and installer of every quality gas fired winter air conditioning job that has been installed since January 1, 1931, under the Gold Seal Certification which will be of considerable value to us in the future.

CERTIFICATION FOR FURNISHING GOLD SEAL QUALITY GAS FIRED WINTER AIR CONDITIONING EQUIPMENT

To:

.....

.....

The following pertinent information is submitted with our proposal to furnish gas fired winter air conditioning equipment.

UNIT PROPOSED

Type or Model ..... Series .....

Btu. per hour input rating as approved by the American Gas Association ..... Air delivery capacity in CFM against 0.2" static resistance at the outlet .....

	Make	*Type*
Main control valve		
Room thermostat		
Limit control		
Blower control		
Humidifier		
Humidity control		
Filter		
Safety pilot		
Gas pressure regulator		
Motor		

H. P. Rating .....

Overall Dimensions: Width ..... Depth ..... Height .....

Casing: Finish ..... Color .....

IT is hereby certified that the unit specified in this proposal is designed to furnish all of the four recognized functions of winter air conditioning, namely, controlled heat, controlled air circulation, humidification, and air filtering; has a capacity to heat a building of not more than ..... Btu. heat loss per hour based on heat leakage factors recognized by the American Society of Heating and Ventilating Engineers, which heat loss is not more than ⅝ of the input rating of the unit in Btu. per hour; and will heat such a building to a 70° F. inside temperature when the outside temperature is zero.

It is also certified that the unit specified will be shipped with the controls and accessories so described in this proposal; and is approved as a central heating plant by the American Gas Association and also is approved by The Peoples Natural Gas Company as having reasonably complied with its Gold Seal Quality requirements for such equipment.

Signed .....

Title .....

Company .....

Address .....

Date .....

Priorities Order Restricts Production of Refrigerators

AIMED to further the national defense program, a series of orders governing usage of materials has been issued in Washington, D. C., by Donald M. Nelson, Director of Priorities. Another order restricted the production of mechanical refrigerators.

The order restricting the production of domestic mechanical refrigerators covers the period from August 1 to December 31, 1941. Factories are placed in three classifications, with production quotas depending upon those classifications. A supplementary order, designed to conserve the supply and direct the distribution of copper scrap and copper base alloy, became effective September 30. It governs purchases by foundries.

The Director of Priorities also issued an interpretation of an order which permits delivery of material to producers engaged in the depletion of natural gas pools, providing gas produced is for general use by the public. The rating in connection with this order, it was pointed out, does not permit application for producers engaged in the discovery or development of natural gas pools.

"Now you're cooking with Gas"
...—THIS OLD SAYING, INDICATIVE OF SUCCESS WHEN USED IN CONNECTION WITH RADIO ACTORS MEANS THEY HAVE ARRIVED, ARE PLAYING BIG-TIME
SO HAVE MORE THAN
17 MILLION MODERN WOMEN
...they're cooking with Gas too!

Familiar radio personalities are tied in with the "Now You're Cooking With Gas" display series.

DECLARE YOUR INDEPENDENCE
FROM KITCHEN DRUDGERY
BY COOKING THE NEW
MODERN GAS WAY
You'll conserve food, fuel and Time
You'll really go to town..
WITH MODERN GAS COOKING
and remember, the health of the family is the strength of the nation

These two modern gas floor displays are planned to meet conditions as they are today.

$1,000,000 . . . In Free Publicity!

By GLENN A. BISHOP

Bishop Publishing Company
Chicago, Illinois

ONE evening about a year ago we were trying to do two things which most people have found impossible—that is, to have the radio on because someone wanted to listen to a certain program, and at the same time try to play bridge. In this case I was glad it was on because across the air waves came this saying or slogan, "NOW YOU'RE COOKING WITH GAS." Somebody suggested that we do something about it and tie in our displays with this idea, but as you know, ideas don't come "just like that!"

During the next few months we heard this same "slogan" on the radio time and time again, heard it so often and tried so hard to find some idea to tie in with it that it became nearly an obsession. More months passed and every few days when listening to some program . . . Bam! Again we would hear "NOW YOU'RE COOKING WITH GAS." It really got me down. So about a month ago while sitting at home listening to a popular radio program —Flash! out of somewhere the idea came to me. I suddenly remembered that in the April, 1941, issue of the A. G. A. monthly there had appeared a story about how this saying, "NOW YOU'RE COOKING WITH GAS," started among the radio stars; so that we finally brought forth a display, shown with this article, which is for gas utilities and possibly their dealers to use starting with the early Fall months. This tie-up is worth "a-p-l-e-n-t-y" to the gas industry because soon nearly everbody will know what this now famous slogan means.

I assure you that obtaining the stars shown—Fibber McGee and Molly, Jack Benny, Barbara Luddy and Les Tremayne, Lanny Ross, Doctor I. Q., Baby Snooks, and Fred Allen—was really a new experience in public relations. I report to you now that the radio industry and the advertisers who support it are nearly as fine a bunch as those now making up the gas industry. That fine old trooper, Ted Lewis, always opens his show by asking this question, "Is Everybody Happy?" Well, we believe that this "NOW YOU'RE COOKING WITH GAS" display will create much happiness because the programs suggested remind people in these crazy times of more pleasant things. Besides, considering the 45,000,000 radios in use in this country, all these national shows and stars, as well as others, are as well known to everybody as anybody you could name.

This is advertising with a "changed pace" to meet present conditions. Likewise, the other two gas displays which illustrate this article, "Declare Your Independence" and "You'll Really Go to Town with Modern Gas Cooking" meet conditions as they are today.

As you know, advertising usually starts when someone invents something new. Naturally, a new article is expensive at first and requires a great deal of research and pioneering work. Then after a long or short interval, if nurtured properly, it may take hold and

possibly a great number of people buy it, thereby lowering the cost per unit. When public approval and acceptance becomes a fact, it is then a good plan to change the advertising approach from one of pioneering to the selling of new refinements—the CP Range is a good example of this. When more people want and are able to buy new CP Ranges, they become more economical than when they were first introduced, providing volume production is assured. Any student knows that reduced volume increases cost per unit, that increased volume lowers it.

Then again, under very unusual conditions such as at the present time, it may become necessary to again change the type of advertising — to provide "future sales insurance" for your company. We believe the latter is what we are all facing in the gas merchandising field and it will continue to a certain extent "for the duration." We also believe the gas displays which illustrate this article prove that advertising need not be dull just because public benefits are featured. We know you will agree that the old-fashioned "stuffy stuffed shirt stuff" is out not only for the duration but for all time. As Moran used to say to Mack, "Who cares about that?"

You have been selling people for years on the comfort, convenience, and economy of gas appliances, likewise the manufacturers have been selling you on their own products. So the wise and farseeing utilities and makers of appliances will continue right along with the same, or larger, advertising schedules as a cushion or protection against the unpredictable, but we believe glorious and "free future," so that we will all be ready to "go to town" when things get back to normal again. Don't forget, when the champ is "knocked out" he is forgotten the next day! Don't let the public forget what your company means to them in comfort and better living. So in the meantime, every last one of you should take advantage of the millions of dollars worth of free publicity the radio stars will drop into your laps during the 1941-42 radio season. Yes, you'll be "COOKING WITH GAS," too!

Gas Service "Blacked Out" At Albuquerque, N. M.

By O. B. PEACORE

Main Line Superintendent, New Mexico Gas Co., Albuquerque, N. M.

A LITTLE more than a week after Albuquerque had participated in an experimental blackout of the entire State of New Mexico, the city of 70,000 population had a taste of one of the things that might happen if enemy bombers were actually hurling destruction from the sky. At 4:30 p.m. Saturday, September 20, a flash flood caused a break in the main line of the New Mexico Gas Co., Santa Fe, N. M., which supplies natural gas at the city gates to the Albuquerque Gas & Electric Co.

The break was only about seven miles from Albuquerque, so close to the city that the pressure at New Mexico Gas Co.'s Albuquerque border station dropped to zero in less than 10 minutes. Albuquerque was completely without gas for the first time in the 12 years it has had natural gas service.

A crew of workmen, starting out immediately to locate the break, found two lengths of pipe completely washed out, and about 400 ft. of pipe damaged. At the spot where the washout occurred the pipe had been buried 8 ft. underground. Before the rainstorm an "arroyo" about 1 ft. deep cut the earth above the line; not in a dozen years had it ever carried more than a trickle of water. After the cloudburst, confined to so small an area that a half mile away from the break no rain fell, the arroyo was 15 ft. deep and some 200 ft. wide.

Stoppage of gas service in Belen, a town 30 miles south of Albuquerque that is served directly by New Mexico Gas, was prevented by the turning of a palve on the outskirts of Albuquerque. Industrial consumers in Belen were cut off, and domestic consumers then were carried for some 16 hours on the line pack. Santa Fe, 60 miles north of Albuquerque, which is also served by New Mexico Gas, also had uninterrupted service, its line branching from the main one which broke.

Forty employees of the New Mexico Gas Co. worked throughout Saturday night to repair the line. Gas was turned back at 7:30 o'clock Sunday morning. The line was purged for 40 or 50 minutes before gas was turned into the Albuquerque system, and the Gas & Electric Co. then continued the purge by turning gas into the boilers at its power plant and burning it there.

Crews totaling more than 200 men, including employees of the Albuquerque Gas & Electric Co., New Mexico Gas Co., and New Mexico Eastern Gas Co., along with a number of local plumbers pressed into service, worked all day Sunday cutting off consumers' meters in the city. Sunday night about 9 o'clock these crews began turning on gas at business establishments, and Monday morning they started the task of inspecting appliances and turning on service to the approximately 10,000 domestic consumers. By Wednesday afternoon gas service was restored to 95% of the city's population.

Preparations made by the Gas & Electric Co. at the time of a flood last spring enabled employees immediately to take up their emergency work, according to Arthur Prager, president and general manager of the Albuquerque company. These preparations, he said, probably shortened the time for resumption of service by "at least 10 days."

"We carefully prepared typewritten instructions to all employees and had on hand all printed cards and instructions for employees to use in sufficient amount to take care of 10,000 customers," Mr. Prager said.

The company had even provided extra flashlights and wrenches, and had compiled newspaper advertisements, radio announcements, and maps for emergency use. The prepared-in-advance program went into effect as soon as gas service stopped.

Throughout the time Albuquerque was without gas, consumers and the public generally cooperated in every possible way with the company. Very few complaints were made. Newspapers appealed to their readers to follow without question the warning instructions of the company and to cooperate fully until service was restored to normal. The *Albuquerque Journal* carried a series of "Gasout Briefs" telling how the people were taking the cessation of gas service. The series reflected the spirit in which gas consumers met the emergency by using backyard fireplaces, giving cooperative neighborhood dinners, and pressing electric hot plates into use.

For several days after service was resumed, employees of New Mexico Gas Co. continued work at the break to prevent any possible re-occurrence.

ASSOCIATION *Activities*

Timely Topics on P.C.G.A.'s Program

GAS STAFF REPORT

WITH his customary military precision, ex-Marine Robert A. Hornby, president of the Pacific Coast Gas Association and vice president of the Pacific Lighting Corp., at 2:15 p.m., September 10, brought to attention the 548 registered delegates assembled in the first general session of Pacific Coast Gas Association's 48th Annual Convention at Hotel Del Monte, near Monterey, Calif. Enhancing the military tone of the sessions was an army bugler who each day sounded assembly to call the delegates to meetings.

The opening session of the convention was to have brought to the rostrum the patriarch of the gas industry on the Pacific Coast, C. O. G. Miller, chairman of the board of Pacific Lighting Corp. Illness, however, prevented the attendance of Mr. Miller and his paper, which traced the growth and development of the gas business, was presented by F. S. Wade, president, Southern California Gas Co. The part which gas utilities are playing in a war economy was covered by W. G. Vincent, vice president, Pacific Gas and Electric Co. The other absentee from the first general session, T. J. Strickler, president of the A.G.A., was substituted for by Arthur F. Bridge, vice president, Southern Counties Gas Co., who read Mr. Strickler's paper, "The Gas Industry—Nationally." Rounding out the first session were the President's address, the election of officers, and In Memoriam.

Elected to lead the Pacific Coast Gas Association for the coming year were:

President: R. S. Fuller, engineer of operation, Pacific Gas and Electric Co., San Francisco.

Vice President: F. M. Banks, vice president, Southern California Gas Co., Los Angeles.

Treasurer: D. G. Martin, general auditor, Pacific Gas and Electric Co., San Francisco.

Directors who will manage the affairs of the Association for the coming year are: R. G. Barnett, vice president-general manager, Portland Gas & Coke Co., Portland Ore.; O. R. Doerr, general sales manager, Pacific Gas and Electric Co., San Francisco; H. W. Edmund, sales manager, Coast Counties Gas & Electric Co., Santa Cruz; R. A. Hornby, vice president, Pacific Lighting Corp., San Francisco; F. A. Hough, distribution engineer, Southern Counties Gas Co., Los Angeles; W. C. Mainwaring, general sales manager, British Columbia Electric Railway Co., Ltd., Vancouver, B. C.; C. O. Menig, vice president, Pacific Gas Radiator Co., Los Angeles; D. H. Perkins, superintendent of gas department, San Diego Gas & Electric Co., San Diego, and W. R. Smith, president, Continental Water Heater Co., Los Angeles.

At the second general session three authorities in their respective fields discussed three topics of current importance to the gas industry on the Pacific Coast. Roy A. Wehe, gas and electric engineer of the California Railroad Commission, in discussing California's gas supply and utilization, spoke of the program currently under way by the Railroad Commission in determining the natural gas reserves in California, their availability, utilization and conservation. Guy W. Wadsworth, Jr., vice president, Southern California Gas Co., in discussing his subject, "Cross-Currents in Industrial Relations," said, "To demonstrate, tangibly, that the worker gets a fair deal, a friendly warning and an opportunity to improve before his job is in actual jeopardy will do much to overcome current distrust of the man in the driver's seat. The fact that management controls only one-half of the strategy, and that it may not get a fair shake from the union, should not discourage us. We can, at least, clean up our own side of the show."

Dynamic Geo. E. Frazer, counsel for the Association of Gas Appliance and Equipment Manufacturers, discussed the current situation in Washington as it affected priorities and the future of the gas industry and its manufacturers. (See pages 26 and 62.)

At the third general session, held Friday morning, three gas industry executives, F. H. Lerch, Jr., president, Gas Companies, Inc.; Herman Russell, president, Rochester Gas and Electric Corp., and F. M. Banks, vice president, Southern California Gas Co., discussed the Institute of Gas Technology. (See pages 27 to 32.)

Prolonged applause greeted the address "Our Economic Ills," of Dr. W. W. Cumberland, economist, Wellington and Co. Dr. Cumberland presented a thorough analysis of the economic effect of the war both on the defense program and on conditions which may face business in the future.

An enlightening demonstration, "The Magic Flame," preceded the third general session, being a series of photographs and experiments dealing with the physical laws of gases and their combustion. This event was directed by Professor L. M. K. Boelter, of the University of California.

President Hornby paid particular tribute to the chairmen who headed the various sections of the committee during the past year: W. S. Binckley, Accounting Section; W. R. Smith, Manufacturers' Section; O. R. Doerr, Sales and Advertising Section; C. P. de Jonge, Technical Section; A. C. Joy, Cooperative Advertising Committee; Mildred Kier, Home Service Committee, and Prudence Hury, Women's Committee. Much credit, too, was due T. W. Snell, general chairman of the convention committees and his many capable assistants, and to Clifford Johnstone, managing director of the association.

Highlight of the banquet, which closed the Convention, was the announcement by President Hornby that the Board of Directors had awarded the Addison B. Day Medal of Honor to C. O. G. Miller, chairman of the Board of Directors of Pacific Lighting Corp. In announcing the award President Hornby said:

> "It is altogether fitting that at this meeting the Pacific Coast Gas Association should honor one of the greatest of our leaders and confer on him the highest award at our command—the Addison B. Day Medal of Honor. . . . One of the pioneers in both the gas and electric industries on the Pacific Coast—one of the founders and a Past President of our Association—a man who through his courage, understanding, personality and sound ability has been a leader not only of our industry but one of the builders of the entire industrial development in this empire west of the Sierras—C. O. G. Miller, now Chairman of the Board of Pacific Light Corp."

Awards

From among the many excellent papers submitted, the following were honored by the Awards Committee:

Gold Medal: To Elting Henderson, Southern California Gas Co., for his paper entitled "Combustible Gas Mixtures in Pipe Lines." (*GAS*, Sept., pg. 23)

Committee Award: To the Sales Training Course Committee of the Sales and Advertising Section, O. R. Doerr, Pacific Gas and Electric Co., chairman.

Honorable Mention: To M. G. Thomas of Southern California Gas Co., for his paper entitled "Proposed Plan of Meter Routing."

To R. F. Ogborn of Southern California

H. L. MASSER
Southern California Gas Co.
F. U. NAYLOR
Pacific Gas & Electric Co.
W. H. VOGAN
A.G.A. Testing Laboratory
HERMAN RUSSELL
Rochester Gas & Electric Corp.
LEROY M. EDWARDS
Pacific Lighting Corp.
F. S. WADE
Southern California Gas Co.
G. W. WADSWORTH Jr.
Southern California Gas Co.
I. B. ADAMS
Pacific Gas & Electric Co.
O. R. DOERR
Pacific Gas & Electric Co.
I. J. DELANEY
Reliance Regulator Corp.
CAPT. A. E. HIGGINS
Pittsburgh Equitable Meter Co.
ARTHUR GELNOR
Republic Steel Corp.
C. A. MILLER
Servel, Inc.
E. J. HINCHEY
Jas. Graham Mfg. Co.
L. E. ELLISON
Southern Counties Gas Co.
W. M. JACOBS
Southern California Gas Co.
CLYDE H. POTTER
Southern Counties Gas Co.
A. R. COMBS
Southern Counties Gas Co.
R. E. FISHER
Pacific Gas & Electric Co.
T. M. BOHEN
Whitehead Metal Products Co.
WAYNE SMITH
Continental Water Heater Co.
R. V. DAVIS
Southern California Gas Co.
ALLEN FESLER
Santa Maria Gas Co.
ARTHUR F. BRIDGE
Southern Counties Gas Co.
WALTER GALE
M. B. Skinner Co.
FRANK McMURRAY
Norton McMurray Co.
FRED McMURRAY
M. B. Skinner Co.
RAY JEWELL
James Graham Mfg. Co.
W. L. HOYT
Day & Night Mfg. Co.
R. G. BARNETT
Portland Gas & Coke Co.
ARTHUR C. MILLER
Pacific Gas & Electric Co.
L. F. GALBRAITH
Pacific Gas & Electric Co.
HARRY J. SMITH
Pacific Gas & Electric Co.
F. F. DOYLE
Pacific Gas & Electric Co.
HAROLD HOWARD
Republic Steel Corp.
W. L. THOMA
Republic Steel Corp.
A. E. HOLLOWAY
San Diego Gas & Electric Co.
J. M. BOURNS
San Diego Gas & Electric Co.
M. B. FOWLER
San Diego Gas & Electric Co.

AT LEFT: Bruce B. Nichols, Consolidated Gas Utilities Corp., speaks to delegates on gas dehydration. CENTER: Speakers' table at luncheon; left to right: E. C. Joullian, chairman gas division; R. K. Lane, president, Oklahoma Utilities Association, presiding; Walter B. Johnson, Commissioner, Department of Public Safety, State of Oklahoma, and W. L. Woodward, first vice president, Oklahoma Utilities Association. RIGHT: E. C. McAninch, chemist, Oklahoma Natural Gas Co., tells merits of long distance controls and gauges.

Gas Co., for his paper entitled "A Collection Follow-Up Procedure for Regular Gas Accounts."

To P. E. Beckman, J. J. Pugh and E. G. Arnedt, all of Pacific Gas and Electric Co., for their paper entitled "Forecasting Winter-day Load in a Natural Gas Territory." This award carries with it the exceptional recommendation of the Awards Committee that it be given consideration in the future for a Gold Medal citation as experience of its value may accrue.

Special Commendation: While no awards were conferred, special commendation was given the following:

B. W. Reynolds of Pacific Gas and Electric Co. for his paper entitled "Gas Promotion in the Emergency."

Gladys Price of Southern California Gas Co., for her paper entitled "Standard Tests for Gas Ranges."

Marguerite Scroggie of Southern Counties Gas Co., for her paper entitled "Follow-up on Clock Control Range Sales."

Manufacturers Section, W. R. Smith, general chairman, for "doing a job of remarkable usefulness to the entire industry."

Cooperative Advertising Committee, A. C. Joy, Pacific Gas and Electric Co., chairman.

Women's Committee, Prudence Hury, San Diego Gas and Electric Co., chairman.

Basford Trophy: To Sales and Advertising Section, O. R. Doerr, Pacific Gas and Electric Co., chairman.

Women's Committee (Yearbook Award): First prize, San Joaquin Power Division of Pacific Gas and Electric Co., Dorothy Henricksen, chairman; second prize, San Diego Gas & Electric Co., Bena Chaney, chairman.

Members of the Awards Committee were: H. W. Edmund, Coast Counties Gas & Electric Co., chairman; Charles Grunsky, Coast Counties Gas & Electric Co.; E. J. Hinchey, Jas. Graham Manufacturing Co.; H. G. Laub, Southern California Gas Co.; R. G. Logue, Ward Heater Co.; C. E. Pearman, Pacific Lighting Corporation; A. F. Rice, Occidental Stove Co., and H. J. Smith, Pacific Gas and Electric Co.

A popular feature of the convention was the Wednesday evening cocktail party which was followed by dinner and the Manufacturer's Hi-Jinx. Staging a burlesque of the popular radio program, "Truth or Consequences," the annual Hi-Jinx, with Chairman Wayne Smith as sponsor and Carl Swigart as master of ceremonies, added a note of hilarity to the proceedings.

C. O. Menig, vice president of the Pacific Gas Radiator Co., Los Angeles, was named general chairman of the Manufacturer's Section for the coming year. General vice chairman will be A. F. Rice, of the Occidental Stove Co., San Francisco. Division chairmen are as follows:

Heating Division: General chairman, W. H. Johnston, Frazer & Johnston Co., vice chairman, L. E. McIlveen, Unimatic Heating System.

Accessories Division: Chairman, E. T. Howard, General Controls Co., vice chairman, J. J. Delaney, Reliance Regulator Corp.

Range Division: Chairman, Roy Ohnimus, Hammer-Bray Co., vice chairman, W. M. Couzens, Gaffers & Sattler.

Water Heater Division: Chairman E. S. Hoyt, Jr., Hoyt Heater Co., vice chairman, G. M. McGaughey, Rheem Manufacturing Co.

Summing up the athletic events of the convention, the skeet shoot and Basford Skeet Cup were won by H. W. Angell, Rheem Manufacturing Co. Second, third and fourth guns were taken by Chas. Grunsky, Coast Counties Gas & Electric Co., H. R. Basford, H. R. Basford & Co., and A. J. Noia, Pacific Gas & Electric Co.

Fifty-five delegates participated in the annual golf tournament, played on the Del Monte Course, on Saturday. The Basford-Babcock-Pedersen Trophy for low net was won by W. J. Bailey, Jr., Day & Night Mfg. Co. Low gross was taken by E. J. Strickland, Southern California Gas Co. Low net winners of the three flights respectively were E. J. Hinchey, Jas. Graham Mfg. Co., Elroy Payne, Payne Furnace & Supply Co., and J. H. Gumz, Pacific Gas & Electric Co. The longest drive was by R. W. Campbell, American Stove Co.; closest to pin was G. McGaughey, Rheem Manufacturing Co.

For more details concerning many of the papers presented before the convention session, turn to page 80.

Oklahoma Utilities Gas Division Annual Meeting

THE Annual Meeting of the Oklahoma Utilities Association Gas Division was held at the Biltmore Hotel, Oklahoma City, Okla., September 26. E. C. Joullian, president of the Consolidated Utilities Corp., Oklahoma City, and chairman of the gas division, opened the meeting.

Clyde H. Hale, Oklahoma City attorney, spoke on "Legal Thoughts from Operating Viewpoints." "Relationship of Non-merchandising Utilities to Independent Gas Appliance Dealers" was the topic of a speech given by Harry Canup, sales manager, Hales-Mullaly, Inc., Oklahoma City. Walter B. Johnson, Commissioner, Department of Public Safety, State of Oklahoma, discussed gas companies and public safety.

E. C. McAninch, chemist, Oklahoma Natural Gas Co., Tulsa, Okla., delivered a paper on, "Long Distance Controls and Gauges," and Bruce B. Nichols, of the Consolidated Gas Utilities Corp., Blackwell, Okla., reviewed some of the experiences of his company in gas dehydration. Methods of installing and servicing floor furnaces were described by Charles F. Morris, engineer, Gas Service Co., Wichita, Kan.

R. K. Lane, president of the Public Service Co. of Oklahoma, Tulsa, and president of the Association presided at the noonday luncheon attended by more than 100 gas company executives and employees.

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C.N.G.A. Technical Meeting Is Scheduled for October 31

The 16th Annual Fall All-Day Technical Meeting of the California Natural Gasoline Association will be held in the Ambassador hotel, Los Angeles, on Friday, October 31, according to the joint announcement of W. C. Dayhuff, president of the Association, and M. W. Kibre, chairman of the Fall Meeting Committee in charge of the event.

One of the feature papers will be titled "The Importance of Natural Gasoline in National Defense," which will be delivered by a representative of the Petroleum Coordinator's office. Other papers planned for the meeting include "Partial Volume and Its Significance," by Dr. B. H. Sage and Dr. Wm. M. Lacy. "Human Engineering in the Petroleum Industry," by George P. Bunn and Wallace Williams; "Studies in Standardization of Gauging Methods for the Shipping of Liquid Petroleum Products by Vehicular Units," by W. B. Parks; "Recycling and Pressure Maintenance," by P. C. Dixon; "Investigation of Standard Methods for Compressor H. P. Calculations," by Tom Dunlap; "Polyform Process," by E. R. Smoley.

A. G. A. Meeting Keyed to Defense

A STREAMLINED program with a strong accent on defense is scheduled for the delegates who attend the American Gas Association's 23rd Annual Meeting in Atlantic City, N. J., October 20-22. With approximately 20% of the nation's industrial machinery devoted to defense work and more being added by the day, it is natural that this year's program should revolve around the gas industry's part in the present emergency. National emphasis on production and economic efficiency led the Association's Executive Board to limit this year's annual event in length and number of meetings with discussion confined to problems of the utmost importance to the gas industry.

General sessions at the two and one-half day meeting will be held Tuesday and Wednesday mornings in the Ballroom of the Atlantic City Auditorium. A general subscription dinner Tuesday evening and a general subscription luncheon on Wednesday will end the annual meeting.

President T. J. Strickler, of Kansas City, will set the keynote of the meeting at the first general session, Tuesday morning, at which time he will speak on the place of the Association and the gas industry in the economic structure of the country. The theme of his address will be the importance of a united gas industry in the light of these uncertain times, with a plea for faith in the future.

Underlining President Strickler's theme and supplementing it, will be an address following the Tuesday evening dinner by Dr. Norman V. Peale, pastor, Marble Collegiate Church, New York, N. Y., on "The Faith of America."

Hugh H. Clegg, assistant director in charge of the Training and Inspection Division of the Federal Bureau of Investigation will give an address on "Mobilization for National Defense." Mr. Clegg, who has been associated with the F.B.I. since 1926, will discuss plant protection, sabotage and other emergency problems.

H. Carl Wolf, president, Atlanta Gas Light Co., Atlanta, Ga., and chairman, Industrial and Commercial Gas Section, will present a discussion of "Promotional Policies in the National Emergency." He will talk on company sales management in view of the need for a uniform national policy in sales of gas during and after the emergency.

An important part of one general session has been set aside for an analysis of emergency and post-emergency research programs. This discussion will be opened by F. Marion Banks, vice president, Southern California Gas Co., Los Angeles. Dr. H. T. Heald, president of Illinois Institute of Technology and the Gas Institute of Technology, will present in detail the Gas Institute program which involves long-range research supported by the industry. (See pages 00 and 00.)

"Survival Value" is the subject assigned to F. Alexander Magoun, professor of human relations, at Massachusetts Institute of Technology, who will be a major speaker at the first general session.

The annual presentation of awards by President Strickler will take place at the Tuesday evening dinner. These include the Charles A. Munroe Award, the McCall Award, the Million Man Hour awards, and the Prize Paper Contest awards. The Association's Finances will be summarized in the report of the treasurer, Ernest R. Acker, president, Central Hudson Gas & Electric Corp., Poughkeepsie, N. Y., at the first general session and the report of the General Nominating Committee will be presented and the election of officers will be held at this session.

Stressing "Nutrition for Defense," the Home Service Breakfast on Tuesday morning will provide a program of interest for home service women, company executives and those particularly interested in sales promotion. The subject of vitamins and minerals will be discussed by J. Ernestine Becker, associate of Dr. E. V. McCullum, in the School of Hygiene and Public Health at Johns Hopkins University and with him co-author of the book, "Food, Nutrition and Health." Another feature of this program will be the presentation of new ideas and applications of home service procedures by Miss Helen Smith of the Rochester Gas and Electric Corp., Rochester, N. Y. Miss Albertine Berry, Lone Star Gas Co., Dallas, Texas, will preside as chairman of the Home Service Committee.

Characteristic of many of this year's sectional meetings are panel discussions and symposiums at which gas industry experts will discuss the problems of the gas utilities in the defense program. The Natural Gas Section on Monday afternoon will feature a group discussion with the following participants, each representing a geographical area of the country: Pacific Coast —A. F. Bridge, vice president, Southern Counties Gas Co., Los Angeles, Calif.; Southwest—R. H. Hargrove, vice president, United Gas Pipe Line Co., Shreveport, La.; Middlewest—B. R. Bay, president, Northern Natural Gas Co., Omaha, Nebr.; Appalachian —C. E. Bennett, president, The Manufacturers Light & Heat Co., Pittsburgh, Pa.; and Great Lakes—J. W. Batten, Michigan Consolidated Gas Co., Detroit, Mich. These exeutives will discuss operating problems peculiar to their areas and additional discussion will be invited from the floor.

The Industrial and Commercial Gas Section sessions are likewise designed to bring the gas men portraits of industrial gas at work in the national

G. S. HAWLEY
Presidential Nominee

E. N. KELLER
Accounting Section

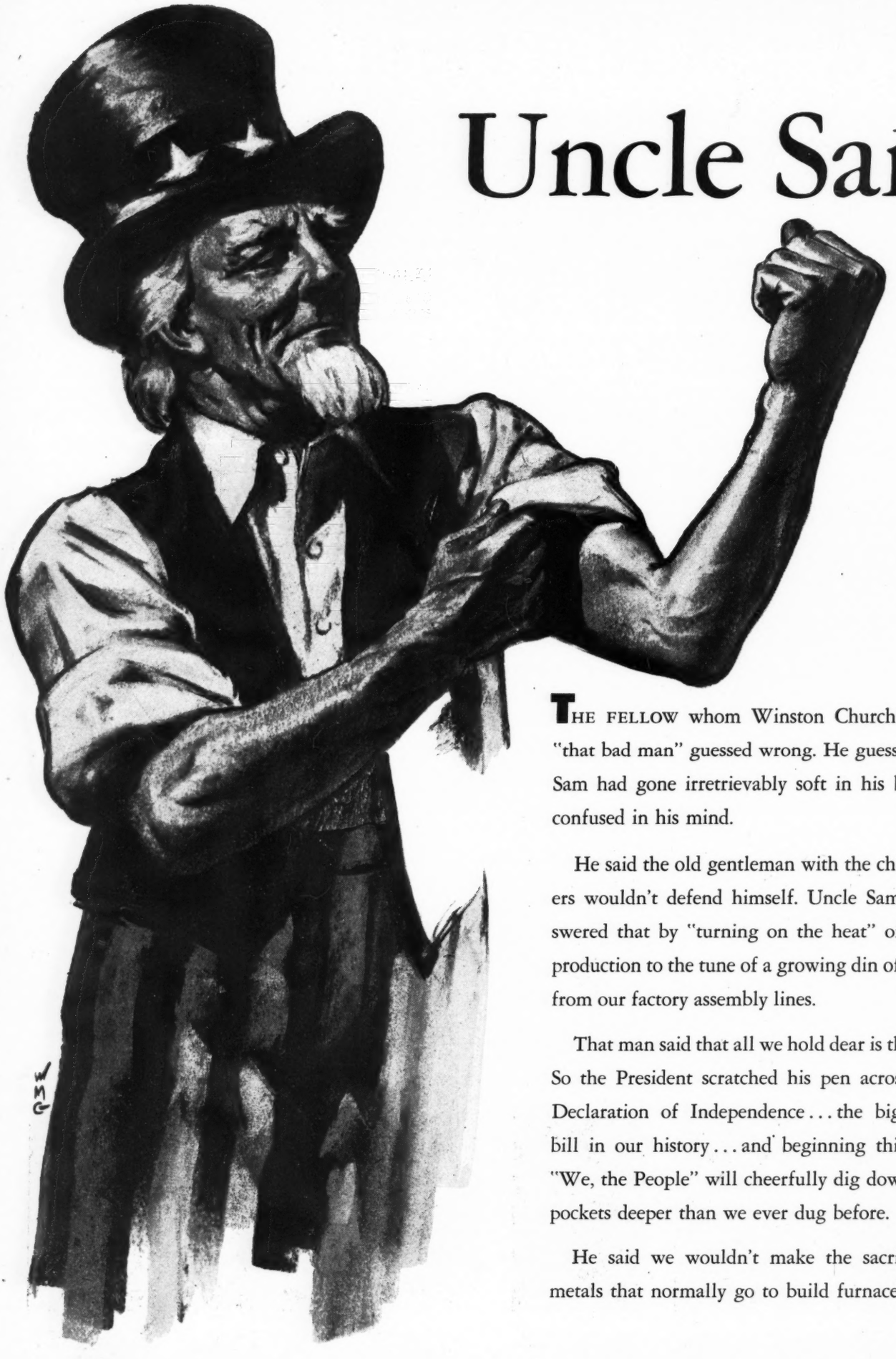
R. J. RUTHERFORD
Residential Section

D. P. HARTSON
Technical Section

H. D. HANCOCK
Natural Gas Section

H. CARL WOLF
Natural Gas Section

Uncle Sam



THE FELLOW whom Winston Churchill called "that bad man" guessed wrong. He guessed Uncle Sam had gone irretrievably soft in his body and confused in his mind.

He said the old gentleman with the chin whiskers wouldn't defend himself. Uncle Sam has answered that by "turning on the heat" of defense production to the tune of a growing din of defiance from our factory assembly lines.

That man said that all we hold dear is the dollar. So the President scratched his pen across a new Declaration of Independence... the biggest tax bill in our history... and beginning this month "We, the People" will cheerfully dig down in our pockets deeper than we ever dug before.

He said we wouldn't make the sacrifices. So metals that normally go to build furnaces, refrig-

"turns on the heat"

...to keep American homes *safe* as well as *comfortable*

erators and hundreds of gadgets that make the American home the most comfortable home in the world are being beaten into guns and battleships, tanks and planes to keep the American home the *safest* in the world.

★ ★ ★

It isn't easy. It has caused production dislocations and headaches for all of us. But the job has been tackled with cheer, aspirin tablets and the good old American spirit that *if it must be done, it must be done well.*

Up to now, Ward Heater Company has been in a fairly good position so far as raw materials for peaceful requirements are concerned. How long this condition will prevail in face of current uncertainties, no one can say with accuracy.

We hope, by keeping our wits sharp, to continue to serve the floor furnace needs of our customers. To the best of our ability we will do so. We are as anxious, obviously, to make shipments to you as you are to get them and so you may depend on it that your orders will receive the promptest attention of which we are capable under the circumstances.

★ ★ ★

Selling a product made of metals in a war economy is not a new experience for Ward. On the market since 1909, Ward Floor Furnaces were building a favorable reputation with the gas industry when World War I spread its catastrophe of flame and famine and violent death over the earth. There are Ward Furnaces in use today that were installed during that conflict.

And the Wards you install today will be building load for you and bringing comfort to your customers long after this holocaust has become a nightmare memory and reason has dawned once more in this mad, muddled world.

Your load is as good as the appliance you sell. Sell the best . . . sell Wards.

WARD HEATER COMPANY • LOS ANGELES

Manufacturers of

WARD FLOOR FURNACES

defense tooling up program and the latest sales material on various phases of commercial gas. A particular feature of the Monday sessions which will open with Chairman Wolf's address will be an executive panel discussion on "Industrial Gas at Work in the Present Emergency." Seven utility and manufacturer company members who will take part in this meeting are: Herman Russell, president, Rochester Gas & Electric Corp., Rochester, N. Y.; Edward J. Tucker, general manager, Consumers Gas Co. of Toronto; Walter C. Beckjord, vice president and general manager, Columbia Gas & Electric Corp., Wilmington, Del.; J. V. Strange, vice president United Public Service Co., Houston, Texas; Frank H. Adams, president, Surface Combustion Corp., Toledo, Ohio.; F. M. Banks, vice president, Southern California Gas Co., Los Angeles, Calif., and R. L. Fletcher, vice president, Providence Gas Co., Providence, R. I.

At the Tuesday afternoon Session which will be devoted to commercial business, Elroy L. Payne, vice president and general manager, Payne Furnace & Supply Co., Beverly Hills, Calif., will talk on "Increasing Your Heating Business in Commercial Establishments," as seen from the heating manufacturer's angle. "Opportunities I See For Selling Commercial Establishments" will be the theme handled by O. F. Keune, Sales Manager, Florida Power & Light Co., Miami, and Carl Sorby, promotion director, Geo. D. Roper Corp., will present "The New Counter Gas Appliances —Your Tools For Future Business— See 'Em; Know 'Em! Sell 'Em!" using an exhibit of many of the modern counter gas appliances, including broilers, grills, steam tables and toasters.

Residential Section

The Residential Section, beginning Monday morning, will be opened by an address by R. J. Rutherford, chairman of the section and vice president of the Worcester Gas Light Co., Worcester, Mass. A report of the Nominating Committee will be delivered by Davis M. DeBard, vice president, Stone & Webster Service Corp., New York, N. Y.

Clifford E. Paige, president, The Brooklyn Union Gas Co., Brooklyn, N. Y., will speak on "Sales Plans and Policies During the Emergency," and Harold L. Ryan, Member Defense Committee Association of Gas Appliances & Equipment Manufacturers, and vice president, Robertshaw Thermostat Co., Youngwood, Pa., will speak on "What's Ahead From the Appliance Manufacturer's Viewpoint."

Fifty representative gas companies in various parts of the United States have submitted questions regarding sales plans and policies for discussion by the sales executives who will participate in the panel discussion of the Residential Section. Among those invited to participate are: N. B. Bertolette, president, The Hartford Gas Co., Hartford, Conn.; F. M. Rosenkrans, new business manager, The Gas Service Co., Kansas City, Mo.; Robert A. Hornby, vice president, Pacific Lighting Corp., San Francisco, Calif.; D. A. Hulcy, president, Lone Star Gas Co., Dallas, Texas; W. C. Mainwaring, general sales manager, British Columbia Electric Railway Co., Ltd., Van couver, B. C., and Louis Ruthenburg, president, Servel, Inc., Evansville, Ind.

Two full sessions, Monday morning and Tuesday afternoon, are planned by the Technical Section for reviews of the outstanding operating problems facing the gas companies. Under the chairmanship of D. P. Hartson, Equitable Gas Co., Pittsburgh, Pa., the first meeting will be devoted to reports of the following committees: Chemical, Distribution, Gas Production, Gas Conditioning and Motor Vehicles. A special part of this program has been set aside for national defense problems. The second session will consist of four papers on operating problems.

The Accounting Section program has been built principally around the luncheon conferences. Seven of these conferences will be held simultaneously on Tuesday, divided as follows: Customer Accounting, Customer Collections, Customer Relations, General Accounting, Property Records, Depreciation Accounting, Taxation Accounting and Insurance. In addition there will be a business meeting on Monday at which election of officers will be held and a report will be read.

Metal Congress Holds Industrial Gas Day

AT the National Metal Congress and Exposition to be held in Philadelphia, Pa., the week of October 20, Thursday, October 23, immediately following the close of the A.G.A. Annual Meeting in Atlantic City, has been designated as Industrial Gas Day. Gas men returning from Atlantic City are invited to attend the Industrial Gas Breakfast at the Benjamin Franklin Hotel, Thursday morning and to see the sixteenth A.G.A. Combined Industrial Gas Exhibit at this meeting.

On Thursday morning, at 8:30 o'clock, the Industrial and Commercial Gas Section will hold the annual Industrial Gas Breakfast which is especially planned for industrial gas men visiting the Metal Exposition. Tickets for the breakfast may be obtained at the Registration Desk of the A.G.A. Annual Meeting in Atlantic City or at the hotel.

A special feature of Industrial Gas Day will be a "Symposium on Controlled Atmospheres" Thursday morning. Ten authorities will participate in the forum which has been divided into four specific subjects, all of which are designed to be of interest to industrial gas men. These defense forums have been planned by government officials and production executives of defense equipment manufacturers with the purpose of devising means for increasing defense production and for the conservation of metal resources and substitutes. Industrial gas men will find an opportunity to discuss their problems with Washington national defense representatives.

The Combined Exhibit, using about 6000 sq. ft. will have a central Gas Industry Plaza around which the 18 cooperating exhibiting industrial gas equipment manufacturers will plan their displays on the theme, "National Defense Needs Speed, Industrial Gas Means Speed for Heat Treating."

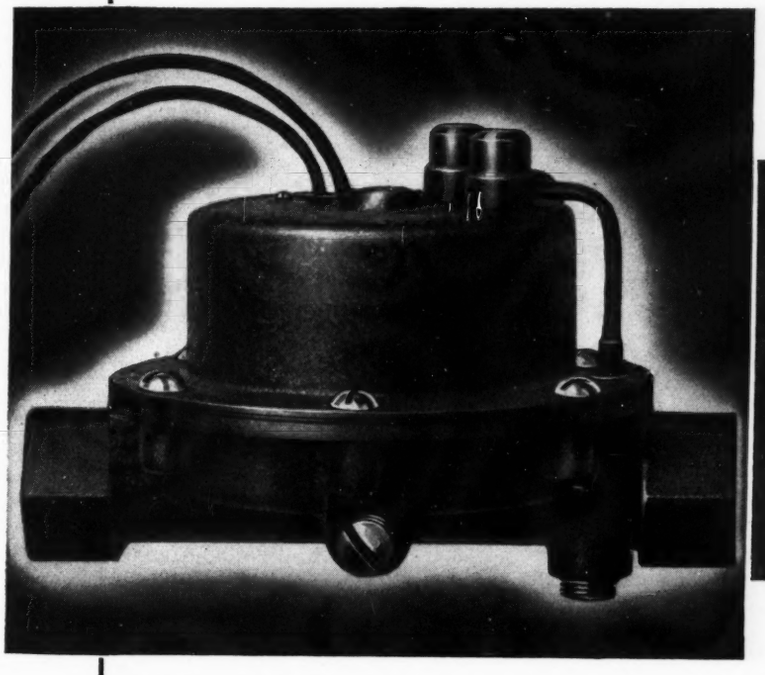
Something new at the Combined Industrial Gas Exhibit this year will be a special display of controls for gas heat treating equipment. These will be grouped according to type rather than by company names, and will show the latest developments in controls for indicating and recording. This part of the exhibit was planned to show means for helping to increase defense production and for the conservation of metal resources and substitutes. The individual manufacturer's spaces surrounding the Gas Industry Plaza will show large and small appliances and equipment used in national defense production, ranging in size from small bench equipment to large especially engineered apparatus; and in character from plain metal heating to highly complicated heat treating. Within the Combined Industrial Gas Exhibit there will be equipment for doing practically every conceivable type of heat treating job encountered in most branches of the metal industry's operations.

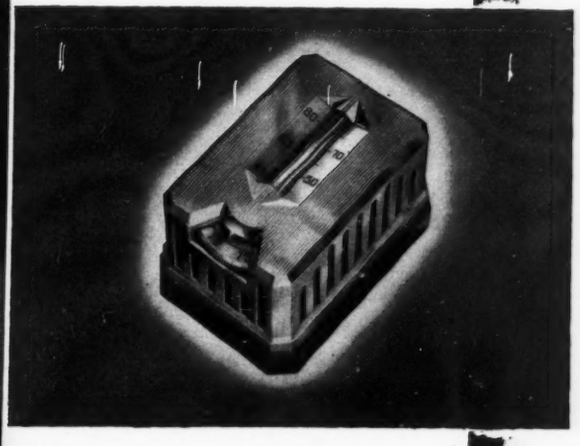
The gas industry's participation in this leading event of the metal industry calendar is under the supervision of a committee of the Industrial and Commercial Gas Section led by Frank H. Trembly, Jr., of The Philadelphia Gas Works Co.

MAKE YOUR HEATER CONTROLS

SNAP-ACTING

FROM TOP TO BOTTOM





In complete packaged sets, Spencer offers you disc-operated, snap-acting thermostats and gas valves—the right combinations for sensitive, accurate, *and quiet* gas heater control.

Klixon Room Thermostats—trim and compact in their designs—are vibration-proof, non-radio-interfering, and positive acting, insuring the most trouble-free accurate control you can get.

Klixon Gas Valves—being free from solenoids—are absolutely silent in operation. No humming, sticking or chattering. Valves come with "Puff bleed", standard or "Constant bleed" at no extra cost. Only 5 watts energized. And manual opening with automatically recycling available at slight extra cost.

Valve sizes range from 3/8" through 1 1/4" I. P. S. Thermostats come with many attractive finishes. Valves and thermostats may be ordered separately as well as in packaged sets. Write for complete information.

KLIXON

TRADE MARK REG U S PAT OFF

SPENCER THERMOSTAT COMPANY • 810 FOREST STREET, ATTLEBORO, MASSACHUSETTS

Left to right at the A. G. A. E. M. speakers' table: G. E. Frazer, A. G. A. E. M. counsel; P. M. McCullough, O. P. M.; W. O. Crabtree, O. P. M.; W. E. Derwent, A. G. A. E. M. president, and L. Metcalfe Walling, U. S. Department of Labor.

A.G.A.E.M. Discusses O.P.M. Functions

THREE prominent government officials—two from the Office of Production Management and one from the United States Department of Labor—presented to the 200 manufacturers and guests assembled at the September 17th luncheon meeting of the Association of Gas Appliance and Equipment Manufacturers an explanation of workings of various government agencies and bureaus in the defense program. The general meeting was held at the Waldorf Astoria hotel in New York City. The speakers included: W. O. Crabtree, district manager, Division of Public Contracts, O.P.M.; Phillip M. McCullough, Eastern Area Coordinator of the Priorities Division, O.P.M.; and L. Metcalfe Walling, administrator, Public Contracts Act, U.S. Department of Labor.

Watson E. Derwent, president of the Association, introduced the speakers. Mr. Crabtree, the first speaker, in outlining the government's effort to speed the subcontracting of defense orders, reported that despite handicaps, tremendous progress has been made. In the first month of the bureau's operation it was able to place only a few hundred thousand dollars in orders, but during August, it placed $28,000,000 in orders.

Mr. Crabtree mentioned that without a far greater subcontracting and conversion of plants to defense, the hardships to many small businesses will be unbearable, but continued in a somewhat more cheerful note by saying, "the Division of Contract Distribution which has absorbed the Defense Contract Service has great plans for the future. Through it, the O.P.M. will more effectively adjust problems growing out of Priorities and material shortages. Four major steps are to be proposed:

1. The breaking down of large orders of supplies into smaller units, and spreading the purchases among more firms and in all localities possible.

2. Providing assistance through the Labor Division of O.P.M. in retaining and obtaining reemployment as a result of the shutting down of some plants or reduction of their output.

3. The effective distribution of defense contracts to the smaller business enterprises, as yet largely unused, through an expanded use of subcontracting, contract distribution, and the pooling of plant facilities.

4. By providing a staff of industrial and production engineers to formulate and execute specific plans for the conversion of non-defense industries and plants to defense production."

He concluded by stating: "The Division of Public Contracts is very determined; I am certain it will be successful in its program."

Mr. McCullough listed the responsibilities of a contractor working under priorities. The chief effect of priorities to date is in metals, he said, pointing out that this country is forced to import 14 important metals in large amounts, and with the war curtailing those imports on the one hand, and the defense effort increasing the demand on the other, the only solution was in priorities and allocation of their use.

"You may make the general deduction," Mr. McCullough continued, "that there is not going to be enough raw materials, and that includes practically all the metals, to serve both the defense program and a vastly expanded output of consumer goods."

In explaining the priorities system, Mr. McCullough said, "Priorities, all of which are mandatory, are invoked in several different ways. The particular method used is determined by the degree of shortage of the material under control, the urgency of the industrial demand for the material, and the importance to defense of the industry which needs the material most.

"Special preference ratings, under the Defense Supplies Rating Plan, are granted to companies under certain conditions. First, if the total volume of their defense work is substantial in relation to the whole, they are granted a special rating for that portion of their production which can be demonstrated to be defense. Under this rating they may secure the materials scarce to them, needed for manufacture of their products.

In closing, Mr. McCullough stated: "We are finding that responsibilities are being accepted by manufacturers in all branches of industry and as the impact of priorities are felt in new areas and by new or additional industries they will be picked up by those operating under them."

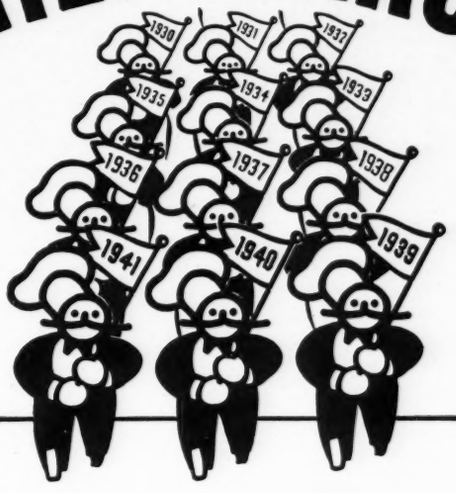
Mr. Walling in addressing the association pointed out that, although the coming wage determination for the industry might not seem of great importance in view of the fact that the industry had only a few million dollars worth of contracts out of the nearly $9,000,000,000 worth which have been awarded since the Walsh-Healy Act became effective, none the less the matter of a minimum wage for the industry was of significance.

"In the first place," he said, "the extent to which the Government has patronized an industry in the past is no criterion of what its purchases in the future may be. The defense program has made the number of purchases of the Government in the past—always of considerable size—seem dwarfed in comparison with the present tremendous buying program of the Government. The situation is changing so rapidly that an industry, which a few months ago at the time a minimum wage was under consideration had relatively little business with the Government, suddenly began to deal with the government in large volume. The situation had altered so radically that members of the industry who had not been particularly concerned about the wage hearing suddenly found themselves very much concerned and regretted that they had not taken a greater share in the proceedings leading to the wage decision."

Mr. Walling pointed out that the objective of the Walsh-Healy Act was not limited to the removel of sweat shop conditions in factories working on government contracts but to the promotion of greater equality in bidding conditions making it possible that the lowest wage employer in an industry does

1919 1941

MAGIC CHEF MARCHES ON!



COPR. 1941, AMERICAN STOVE COMPANY

23 Years of Telling and Selling America Gas Cookery in these Leading Magazines!

AND SO TODAY in the present emergency Magic Chef carries on! The Magic Chef program of magazine advertising continues this Fall without reduction. This continued advertising and sales promotion will help maintain leadership of the Magic Chef name in public approval. Benefit by going along with Magic Chef advertising and make it your own!

What place domestic appliances will eventually take in the Preparedness Program is not predictable at this time, but the need to safeguard the public health by making available economical modern ranges, is a prime essential to the Nation's well-being and cannot be overlooked.

1941 Magic Chef national advertising will appear in Saturday Evening Post, Ladies Home Journal, Woman's Home Companion, Better Homes and Gardens, American Home, and Good Housekeeping.

AMERICAN STOVE CO. *World's Largest Manufacturer of Gas Ranges*

BOSTON . . . NEW YORK . . . ATLANTA . . . CLEVELAND . . . ST. LOUIS
CHICAGO . . . PHILADELPHIA . . . SEATTLE . . . WASHINGTON
SAN FRANCISCO . . . LOS ANGELES . . . PITTSBURGH . . . BALTIMORE

Magic Chef **GAS RANGES**

THE "RED WHEEL" GAS RANGE WITH THE LIFETIME BURNER GUARANTEE

SELL (CP) *to sell America on modern Gas Cooking*

GAS THE MODERN WONDER FUEL

not necessarily get the contract award in every case as had been so conspicuously true prior to the enactment of the Act.

Mr. Walling spoke in some detail about the procedure to be followed in connection with the wage determination. He emphasized that it was the policy of his office always to confer with representative members of management and labor to have their counsel from the start so that they would be able to participate in all the proceedings and share in the final result.

At a membership meeting following the luncheon, George E. Frazer, counsel for the association, discussed the effects on the industry of the defense program, and answered questions put by those present. Mr. Frazer reported that the gas appliance industry has not yet been officially ordered to curtail production by the O.P.M., but that manufacturers are finding it increasingly difficult to get raw materials and that the industry expects soon some form of curtailment.

Mr. Frazer mentioned that the claim in behalf of the gas appliance and equipment industry for preference ratings may be briefly stated under five headings: (See Page 00, editorial, "A Call for Realism.")

C. L. Hewitt, Jr., of the Mueller Furnace Co., an impromptu speaker on the program, discussed a recent bulletin of the O.P.M. entitled "Procedure for Obtaining Preference Rating for Privately-Owned Defense Housing Construction."

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Appalachian Measurement Fourth Annual Meeting

The fourth annual meeting of the Appalachian Gas Measurement Short Course was held at West Virginia University, at Morgantown, W. Va., on August 18-20, with A. F. Kraus, superintendent of gas measurement of the Peoples Natural Gas Co., Pittsburgh, Pa., presiding as chairman of the general committee.

Speakers at the meeting included: Dr. C. E. Lawall, president of West Virginia University; C. C. Reed, Hope Natural Gas Co.; Dr. Reginald L. Wakeman, Mellon Institute of Industrial Research; Dr. R. C. Colwell, physics department, West Virginia University; Judge E. B. Pennybacker, chairman, Public Service Commission of West Virginia; William A. Ehlers, Reynolds Gas Regulator Co.; T. H. Kerr, The Ohio Fuel Gas Co.; A. D. MacLean, Pittsburgh Equitable Meter Co.; E. H. Poe, secretary, natural gas section of the American Gas Association, and A. F. Benson, American Meter Co.

General sessions covering the field of measurement and pressure regulation took place during the morning sessions of each day and the afternoon sessions were devoted to classroom study of equipment and problems specifically related to gas measurement and pressure control.

The executive committee included: G. R. Spindler, chairman, West Virginia University; A. F. Kraus, The Peoples Natural Gas Co.; R. W. Hitchman, United Fuel Gas Co.; Stacy Jones, South Penn Natural Gas Co.; J. E. Overbeck, Columbia Engineering Corp.; Lawrence Hunter, Columbia Carbon Co.; G. W. Harr, Monongahela West Penn Public Service Co.; Joseph M. Low, Hope Natural Gas Co., and T. K. Spalding, Owens-Libbey-Owens Gas Department.

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Mid-Year Meeting Is Held By Maryland Utilities

The Mid-Year Meeting of the Maryland Utilities Association was held at the George Washington Hotel, Ocean City, Md., September 5-6. More than 250 persons attended the meeting.

Speakers at the business program, conducted on Saturday, September 5, included Chester W. Cambell who spoke on "Building Protection for New York City in Case of Aerial Bombardment," Paul Merrick, who titled his talk, "Pulling Together," and Larry F. Livingston, who spoke on "Chemurgy."

A bridge tournament, bathing, fishing, boating and an informal banquet were among the social and recreational activities.

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New Jersey Gas Association

According to an announcement made by H. A. Sutton, secretary-treasurer of the New Jersey Gas Association, the Regional Meetings Committee of the Association has been organized and tentative dates are now set for the annual regional meetings. Five meetings will be held throughout the state and the tentative dates and locations are as follows: Millville, November 6; Hackensack, November 7 or November 14; Allenhurst, November 12; Camden, November 13; and Newark, November 17. Only Camden and Millville are definite.

CALENDAR

October

West Virginia Oil and Natural Gas Association — Annual Convention, Clarksburg, W. Va., October 2-3.

National Safety Congress and Exposition—Stevens Hotel, Chicago, Ill., October 6-10.

New England Gas Association, Operating Division—Hotel Bond, Hartford, Conn., October 8.

American Society of Mechanical Engineers—Louisville, Ky., October 12-15.

American Gas Association — 23rd Annual Convention, Atlantic City, N. J., October 20-22.

A.G.A. Combined Industrial Gas Exhibit, 1941, National Metal Congress and Exposition—Philadelphia, Pa., October 20-24.

Fall Meeting, Petroleum Division, American Institute of Mining and Metallurgical Engineers—Ambassador Hotel, Los Angeles, Calif., October 29-30.

California Natural Gasoline Association —Los Angeles, Calif., October 31.

November

New Jersey Gas Association Regional Meetings — Millville, N. J., November 6; and Camden, N. J., November 13.

Mid-Southeastern Gas Association, Annual Meeting, and Institute for Gas Plant Operators—State College, Raleigh, N. C., November 13-14.

December

National Industrial Council — Waldorf-Astoria Hotel, New York, N. Y., December 1-2.

American Society of Mechanical Engineers—Annual meeting, New York, N. Y., December 1-5.

New Mexico Oil and Gas Association—Artesia, N. M., December 5.

New England Gas Ass'n Holds Division Meetings

The New England Gas Association recently held Division meetings lasting one day in various cities of that section of the country. The Industrial Division met on September 19, at the Stow Country Club, Stow, Mass. Speakers at the meeting were John J. Quinn, sales manager, Boston Consolidated Gas Co., who spoke on "Sales Planning in This Defense Era," and Ralph L. Towne, sales promotion manager, The Surface Combustion Corp., who spoke on "Keep 'Em Buying."

The Accounting Division met at the City Club, Hartford, Conn., on September 25. Speakers at the meeting were: Thomas H. Buckley, Public Service Co. of New Hampshire, who spoke on, "Methods of Handling Split Pay Rolls"; and Maurice L. Blanchard, accountant, Webster, Horne & Blanchard, who spoke on "Some Phases of the Wage and Hour Act."

Chief speaker at the Sales Division of the Association held at the University Club in Boston on September 26, was E. C. Sorby, sales production manager, Geo. D. Roper Corp., whose talk was titled, "There's Magic in Modern Cookery!"

On the afternoon of October 8, the Operating Division held discussion conferences at the Hotel Bond in Hartford, Conn. Discussion leaders of the Production, Meters, and Distribution and Utilization groups were C. W. Rainville, A. McW. Wolfe and G. P. Langton.

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Mid-West Gas Association Draws Record Attendance

The 21st Annual Gas School and Conference, sponsored by the Mid-West Gas Association and the Engineering Extension Service of Iowa State College, was held at Ames, Iowa, September 8-10, 1941. Attendance surpassed the 300 mark, a record for the conference.

The General Meeting was called to order by H. K. Wrench, general chairman. A "Welcome to Iowa State" was then given by T. R. Agg, dean of engineering, Iowa State College, Ames, Iowa. A message from the American Gas Association was delivered by Major Alexander Forward, managing director of the A.G.A., which was followed by a talk on "The National Defense Problem," by Edward Durfee, of the Consolidated Edison Co., New York, N. Y. Following the General Meeting, the Utilization; Meter and Meter Repair School; Distribution and Production Section Meetings were held.

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Petroleum Division A.I.M.E. Fall Meeting in Los Angeles

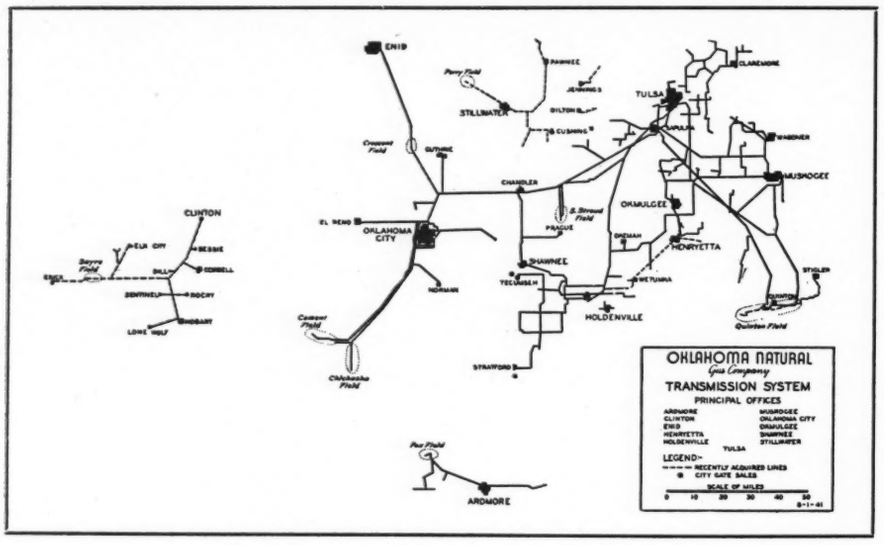
The Fall Meeting of the Petroleum Division of the American Institute of Mining and Metallurgical Engineers will be held at the Ambassador hotel, Los Angeles, on October 29-30.

The Technical Session, headed by W. H. Geis, chairman, and L. W. Huebel, vice chairman, will take place on Wednesday morning, October 29.

On Thursday afternoon, the Forum Session will be held under the direction of John F. Dodge, chairman, and H. N. Marsh, vice chairman. Of particular interest to the gas industry will be a speech to be given at the Forum Session by William Moeller, Jr., vice president, Southern California Gas Co., titled "The Gas Company's Viewpoint."

We have placed a large portion of our production facilities in the service of the United States Government . . . At the same time, recognizing the vital necessity of maintaining gas service, we are doing our utmost to give you the best deliveries possible.

KITSON COMPANY **K-CO** TRADE MARK 1500 Walnut St., Philadelphia, Pa.



Pipe line and distribution systems of the Oklahoma Natural Gas Co. which now include the lines formerly operated by Central States Power and Light Corp.

Oklahoma Natural Buys Utility System

NEGOTIATIONS for the purchase of the Central States Power and Light Co. by the Oklahoma Natural Gas Co., which began almost two years ago, are now completed. Cities whose gas distribution systems are involved in the $4,700,000 transaction include Henryetta, Wetumka, Okemah, Holdenville, Quinton, Stigler, Stillwater, Oilton, Jennings, Pawnee, Clinton, Cordell, Elk City, Erick, Carter, Sentinel, Rocky, Dill City, Bessie, Hobart and Lone Wolf, Okla.

By the purchase of this property, Oklahoma Natural has added approximately 18,600 customers to its system: 4700 in the Tulsa district; 6800 in the Oklahoma City district; 3600 in the Okmulgee district; and 3500 in the Shawnee district.

For the most part, the personnel in the various communities will remain unchanged, adding approximately 70 to the number of Oklahoma Natural employees. The former Central States communities have been assigned to the following Oklahoma Natural districts:

The Clinton district, which includes the towns of Clinton, Cordell, Hobart, Elk City, Lone Wolf, Erick, Carter, Bessie, Sentinel, Rocky and Dill City, will come under the supervision of the Oklahoma City district, with T. H. Sterling district manager. C. H. Rick, formerly with Central States, remains in charge of the newly acquired district.

The Stillwater district, including Stillwater, Oilton, Ripley Field, Jennings and Pawnee, will be headed by F. E. Kee, W. A. Hazard and N. A. Newton, who serve as chief clerk, district superintendent and sales manager, respectively. A. L. McGaugh will remain directly in charge of the activities of that district.

The Okmulgee district, including the towns of Henryetta, Quinton and Stigler, will be supervised by C. M. Van Slyke. The towns of Okemah, Holdenville and Wetumka have been added to the Shawnee district, of which F. E. Padden is district manager. A. H. Burgess, formerly of the Central States company, is in charge of newly acquired properties in the Okmulgee and Shawnee districts.

■ ■

Oklahoma Natural Gas Co. Plans $200,000 Expansion

The Oklahoma Natural Gas Co., Tulsa, Okla., has announced through Joseph Bowes, president, a $220,000 expansion program to increase the capacity of its transmission system by approximately 20,000,000 cu. ft. daily.

New construction will include two 16-in. natural gas lines of about 17 miles each scheduled to be installed by December 1. One of the lines will connect the distribution system of the company at Oklahoma City with a point at the South Canadian river crossing southwest of the city. This line will bring an additional supply of gas from the Cement field to meet increased demand created by the national defense industries. The other 16-in. line will extend from Rich Junction to Depew in Creek county and increase carrying capacity of the transmission system into Tulsa.

■ ■

Nine-Mile Pipe Line Serves Lake City, Kan., Arms Plant

An 8-in. gas line from Independence, Mo., to the government small arms plant to be operated by Remington Arms at Lake City, Kan., has just been completed.

The 9-mile line, supervised by L. C. Peddicord, Garden City, Kan., contractor, was built from the gas plant of The Gas Service Co., in Independence.

Gas Transport, Inc., Asks For Use of 36-Mile Line

THE Federal Power Commission has announced receipt of an application by Gas Transport, Inc., a newly-formed subsidiary of the Anchor Hocking Glass Corp., asking for a certificate of convenience and necessity covering its proposed acquisition and operation of a 38-mile pipe line now under construction by the parent company and extending from the vicinity of New Era, W. Va., to the vicinity of Gravel Bank, Ohio.

The 38-mile line is being constructed by Anchor Hocking, as a substitute due to the steel shortage, for an 87-mile pipe line extending from Sandyville, W. Va., to the company's two glassware plants in Lancaster, Ohio, with respect to which the Commission disclaimed jurisdiction in April, 1941, following consideration of a petition by the company. As an alternative proposal, the application states, Anchor Hocking entered into an agreement with the Ohio Fuel Gas Co., Columbus, Ohio, under which Ohio Fuel agreed to transport gas over its existing facilities from Gravel Bank to Lancaster, Ohio, and Anchor Hocking agreed to construct a natural gas pipe line from New Era, W. Va., to the intake of Ohio Fuel's existing facilities at Gravel Bank.

The application states that Anchor Hocking's natural gas requirements will take up less than one-third of the capacity of the new line and that Ohio Fuel desires to avail itself of the extra capacity of the line to transport gas for its own use.

■ ■

Laclede Gas Light Co. Claim Is Settled for $50,000

Settlement of a $320,000 four-year-old claim of the Laclede Gas Light Co., St. Louis, Mo., against United Collieries, Inc., Cincinnati, Ohio, in connection with alleged overcharges for coal for $50,000 was announced recently by L. Wade Childress, president of Laclede.

When Laclede Gas Light Co. and United Collieries were subsidiaries of Utilities Power and Light Co., Chicago, prior to 1937, Laclede was forced to purchase coal from United Collieries without competitive bidding and at excessive prices, the claim, filed in United States District Court in Chicago, set out. The overcharge recovery action was begun after Utilities Power went through bankruptcy reorganization proceedings. Under the reorganization, control of Utilities Power and subsidiaries, including Laclede Gas, last year went to the Ogden Corp. of New York.

■ ■

Hearing for Natural Gas in Wisconsin Is Continued

The Wisconsin Public Service Commission has granted the Western Natural Gas Co. permission to introduce into the record 85 pages of cost and engineering data in connection with the Commission's hearing on the petition of the firm and the Independent Natural Gas Co. and the Natural Gas Pipe Line Co. of America to bring natural gas into Wisconsin.

The hearing was then again resumed August 12 with Paul Kayser, president of the Western Natural Gas Co., and A. L. Forbes, Jr., engineer and vice president of the El Paso Natural Gas Co., as witnesses.

Mr. Kayser testified his firm would build an 804-mile pipe line from Hugoton, Kan., to Milwaukee at a cost of $22,044 per mile. Capacity of this line would be increased after three or four years' operation, he said.

A10 Priority for Maintenance Granted

DONALD M. NELSON, director of priorities, recently issued a maintenance, repair and supplies priority order permitting natural and manufactured gas companies and other public utilities and their suppliers to use an A-10 rating to facilitate deliveries of maintenance and repair materials and operating supplies which are vitally needed for defense and essential public services.

The new order, P-46, similar to the P-22 order issued the previous week for oil producing, refining and transportation, and 19 other essential industries, provides that the A-10 rating may be used by either the utility or the supplier to obtain three classes of material:

1. Maintenance material—needed for the upkeep of property and equipment in sound condition.

2. Repair material—needed for restoration of property and equipment to sound condition after wear and tear, damage, destruction or the like.

3. Operating supplies—material essential to the operation of the utility involved and which is generally carried in the company's stores and charged to operating expense.

The rating cannot be used for plant expansions or new improvements, or for expansion of the service area of the utility. However, the rating may be used in some cases to provide for connections for new consumers to the existing utility system and also for materials to relieve serious overloads.

A producer before using the preference rating to expedite deliveries, must execute two acceptance blanks attached to the order and must file one executed copy of the acceptance with the Power Branch of the Office of Production Management, retaining the other copy. Suppliers, however, must not execute the acceptances. The Producer or his supplier, in order to apply the preference rating, must endorse on his purchase orders the following statement: "Purchase order for utilities operation, maintenance and repair, preference rating A-10, pursuant to Preference Rating Order No. P-46."

The order includes provisions to keep producers' inventories at practical working minimum levels and includes certain provisions of a technical nature designed to restrict purchases and withdrawals from inventories to certain 1940 levels, except when special circumstances are involved. It is designed especially to cover problems which have arisen in the utilities field and includes a number of technical provisions designed especially for utility problems. The order itself, therefore, must be read carefully.

The order contemplates that the Director of Priorities will, in the near future, certify specific quantities of materials to which the rating may be applied by the utilities to whom the rating has been assigned. In connection with this, utility companies will be required to file reports on inventory and other information on which the certification may be based.

■ ■

Patrol Force to Guard Properties of Gas Company

A uniformed patrol system has been organized by the operating division of the Peoples Gas Light & Coke Co., Chicago, for the purpose of controlling admittance to all production and distribution stations of the company, the district shops, garages, warehouse building and archives building. Thirty of the 100 proposed guards are now on duty.

The patrol organization is supervised by Capt. Charles G. Essig, formerly of the Chicago Police Department. All company employees are required to present proper identification at the entrance to the property before admittance. Employees whose work frequently brings them to and from the properties have been provided with identification cards bearing their names and departments.

■ ■

El Paso Natural Gas Co. to Close Gaps Along Jal Line

The El Paso Natural Gas Co., with the completion of the survey work for loop lines to be laid from Clint to Station No. 3, Salt Flats toward Station No. 2, from the Guadalupe Rim Rock toward Salt Flats, and between Jal and Station No. 1, has closed the last gaps in the main pipe line from Jal, N. M., to El Paso, a distance of 200 miles.

In 1936, several years after the first line was laid from Jal to El Paso, the first loop was laid from the Jal plant to a point 10 miles west toward El Paso. Since then, loops have been added at different points, and after the construction work is completed on the locations mentioned above, the first point in the main line which consists of a single pipe will be at Animas, N. M.

Indiana Corporation Formed By Utility Consolidation

PUBLIC Service Company of Indiana, Inc., a new corporation with a capitalization of $108,035,721, was recently formed when formal articles of consolidation were filed with the secretary of state of Indiana.

The new company is successor to the Public Service Co. of Indiana, its subsidiary, Dresser Power Corp., Central Indiana Power Co. and its subsidiary, Northern Indiana Power Co., and Terre Haute Electric Co., Inc. All of the consolidating companies were subsidiaries of the Midland United Co. of Chicago, a holding company formerly controlled by Samuel Insull.

R. A. GALLAGHER

President of the new company is Robert A. Gallagher of Indianapolis, former president of the Public Service Co. of Indiana. L. B. Schiesz, Indianapolis, former president of the Central Indiana and Northern Indiana companies, is first vice president. Other officers are G. J. Oglebay, vice president; D. P. Pardee, vice president and comptroller; E. J. Booth, secretary; Paul Stark, treasurer; Earl H. Conway, assistant comptroller; Lois Allen, assistant secretary; and Arthur E. Irwin, assistant treasurer.

The new company, with general offices in the Traction Terminal Building, Indianapolis, is the largest public utility in the state of Indiana. It serves approximately 222,000 electric customers, 49,000 gas customers and 27,000 water customers in more than 600 communities of central and southern Indiana. As of August 1, 1941, the consolidated companies had 3150 employees.

■ ■

Arkansas-Louisiana Gas Co. Will Serve Defense Plant

An addition to the distribution system of the Arkansas-Louisiana Gas Co. is being built to serve the $10.000.000 ammonium picrate plant which will be constructed by Cities Service Defense Corp. at Marche, Ark.

The natural gas line will be laid around Little Rock to connect with the company's line from Clarksville to serve the new defense plant north of Little Rock and to insure uninterrupted service for Camp Robinson, at Little Rock.

Following an extensive building and remodeling program, the L. J. Mueller Furnace Co., Milwaukee, Wis., now has spacious new general offices and numerous remodeled private offices—all completely air conditioned and fluorescent lighted.

SALES Slants

Story Book Tales Will Bring CP Sales

A NEW "story book" theme for the promotion of CP gas ranges will be introduced in the Fall sales promotion campaign, according to an announcement made by the CP Sales Management Committee of the Association of Gas Appliance and Equipment Manufacturers. The booklet will present the CP merchandising story, from both the utility and the dealer sales viewpoint. The campaign is considered one of the most novel direct mail promotions of its kind.

The campaign portfolio starts out with the familiar story book beginning, "Once upon a time . . ." and continues in that style reciting the trials and accomplishments of a man who made his living selling appliances. The salesman's wife finally sets him straight on what the American homemaker wants, pointing out that "1,742,000 modern gas ranges were sold last year and not only that, but thousands bought the very finest cooking appliance . . . the CP Gas Range!" The story leads up to a complete merchandising plan for gas utilities and dealers, and has many forceful sales aids for salesmen. The portfolio contains pieces of colorful and practical literature including direct mail pieces, newspaper advertisement mats, window and sales floor displays, a cook book and numerous other sales aids.

Another feature of the portfolio is a new door-opener, the CP Vita-Key. The Vita-Key is a revolving disc on which vitamin and time temperature charts are printed. One side lists 30 important foods and their vitamin content, the other side explains the oven temperature and cooking time of various foods. The campaign includes the popular "Audio Training" method, used in last year's program, which is a method of improving the sales presentation of the individual salesmen. This gives the salesman the opportunity of hearing himself as others hear him and of judging himself as others judge him. The last page of the campaign portfolio contains a gas industry message on a recording made by Lowell Thomas, the news analyst and commentator. Measuring 8½x11 in., the book is produced in four colors on heavy stock.

The "Story Book" cover of the CP Range Fall Campaign Booklet.

■ ■

A. G. A. National Fall Ad Campaign Program Started

Last month the first A. G. A. ads of the 1941-42 series appeared in magazines of national circulation. Numerous gas companies used reprints of these ads for home service demonstrations, house-to-house calls and for counter distribution on sales floors.

The first two national ads are full-page color ads containing pictures of modern kitchen interiors. A dual copy theme, presenting "His" views and "Her" views is used in these ads which are headlined: "The Wife's side. . ." and "The Husband's side . . .", and "Home—as she sees it!" and "Home—as he sees it!"

One of the ads, which appeared in *Life* magazine, September 22, will be seen again in the October issue of *Better Homes and Gardens*. The other ad is scheduled for publication in *Life* magazine, October 20, *Good Housekeeping*, October, *McCall's Magazine*, October, and *Woman's Home Companion*, October. Reprints of these ads may be obtained from the American Gas Association, Committee on National Advertising, 420 Lexington Ave., New York, N. Y.

■ ■

October Range Campaign Will Use 18 Radio Stations

The Jean Scott Frickelton agency, San Francisco, Calif., has been appointed by the Gas Appliance Society of California to handle a campaign on gas ranges during October in northern and central California. Media will include 18 radio stations with participations on home economics programs and other women's features; newspapers; dealer displays; a salesmen's contest; folders direct mail; free mat and publicity service.

Gas Appliance Sales Show Sharp Increase at Mid-Year

ACCORDING to statistics released by the A.G.A.E.M. gas range and gas water heater sales have increased 40.4% and 42.2% respectively in the first six months of 1941 over 1940. The increase in domestic gas customers during the same period is 3.3%. The monthly increases are shown below:

Shipments of Gas Ranges

	1941	*1940*	*% Incr.*
January	131,700	91,000	44.6
February	133,700	124,300	7.6
March	212,700	154,600	37.6
April	230,400	170,900	34.8
May	248,400	169,900	46.2
June	237,700	141,000	68.6

Shipments of Gas-Fired Water Heaters

	1941	*1940*	*% Incr.*
January	46,786	35,261	32.7
February	43,210	35,355	22.2
March	59,785	41,231	45.0
April	64,567	42,270	52.7
May	67,068	49,169	36.4
June	71,322	44,821	59.1

Domestic Gas Customers Served
(Millions of Gas Customers)

	1941	*1940*	*% Incr.*
January	16.80	16.35	2.8
February	16.86	16.40	2.8
March	16.86	16.40	2.8
April	16.87	16.36	3.1
May	17.17	16.48	4.2
June	17.03	16.50	3.2

Although no figures are available on gas conversion burners, circulating heaters or residential space heaters, reports from 17 manufacturers show that central heating appliances (boilers and furnaces) were up 58.7%.

■ ■

Magic Chef Fall Promotion Campaign Has Many Themes

The American Stove Co. has announced that their fall promotion campaign for Magic Chef ranges will incorporate past themes with present and future angles tied-in. The themes are to be: the advantages of gas cookery; the "Inside Story of a New Defense Weapon"; cooking with gas to preserve vitamins and guard national health; the economy and speed of Magic Chef operation, and the quality of Magic Chef construction and performance.

The 1941 Magic Chef Old Range Round-Up will be continued and window streamers, stickers, display cards, ad blow-ups, billboard posters, newspaper ads, movie slides, roto broadsides, direct mail stickers for letterheads and hand-bills will be used.

■ ■

United Gas Corp. Launches Annual Better Heat Drive

The Seventh Annual Better Heat for Better Health program of the United Gas Corp., Houston, Texas, began August 26 in the form of a "Hit the Bull's-eye" campaign. It will close December 20.

The theme of the campaign was introduced by J. V. Strange, vice president and general manager of the company, to employees in the form of a letter. The company will use 28 newspaper ads in the 1941 Bull's-eye Better Heating campaign. Other media will include bill envelope, recipe bill stuffer advertising and window display placards.

■ ■

5,000,000-ft. Gasser Struck

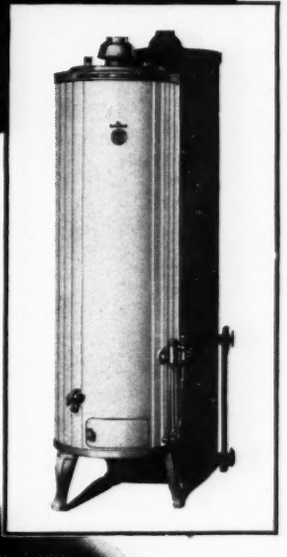
The largest producing natural gas well drilled in the last 18 years in the Youngwood section of Pennsylvania was brought in recently eight miles from Greensburg, Pa.

No gas-fired products in the United States are more widely distributed than those made by—

BASTIAN-MORLEY CO., INC.

LAPORTE, INDIANA

● Bastian-Morley Co., Inc., manufacturer of Crane Gas Water Heaters and Crane Basmor Gas-Fired Boilers, has been a factor in the development of gas business for 28 years . . The distribution of the company's products through the plumbing trade has served to greatly broaden the flow of gas appliances into the nation's homes. The Crane Registered Gas-Equipment Dealer plan, through which plumber-dealers are encouraged and trained to put their effort back of gas-fired products, has grown from a meager beginning of less than 500 registered dealers in 1933—to more than 6,000 in 1941! These dealers, with the force of Crane Co. behind them, are playing an increasingly important part in the merchandising, sale, installation and service of gas appliances . . Utility executives are invited to contact their nearest Crane Co. branch for details of important co-operation they may receive from this registered dealer organization. Or write Premier Heater Division, Bastian-Morley Co., Inc., LaPorte, Indiana.



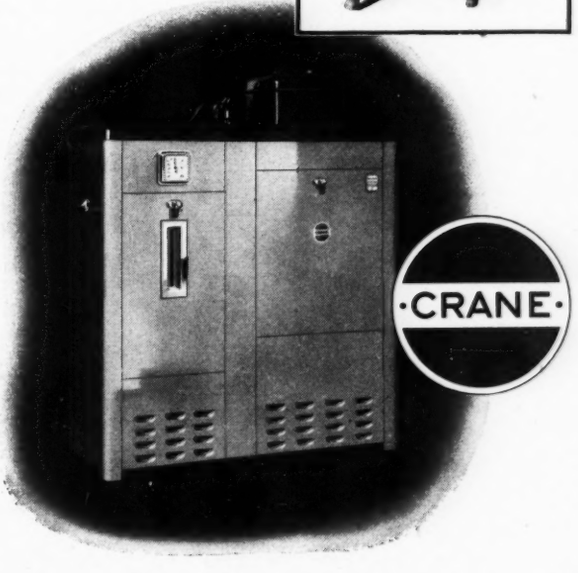
CRANE GAS WATER HEATERS

Made in 10 styles and 12 sizes with input ratings ranging from 5,000 B.t.u. to 150,000 B.t.u.

★

CRANE BASMOR GAS-FIRED BOILERS

For steam, hot water and vapor heating—and for large volume hot water supply. Made in seven styles and 130 sizes with capacities up to 4,800,000 B.t.u.



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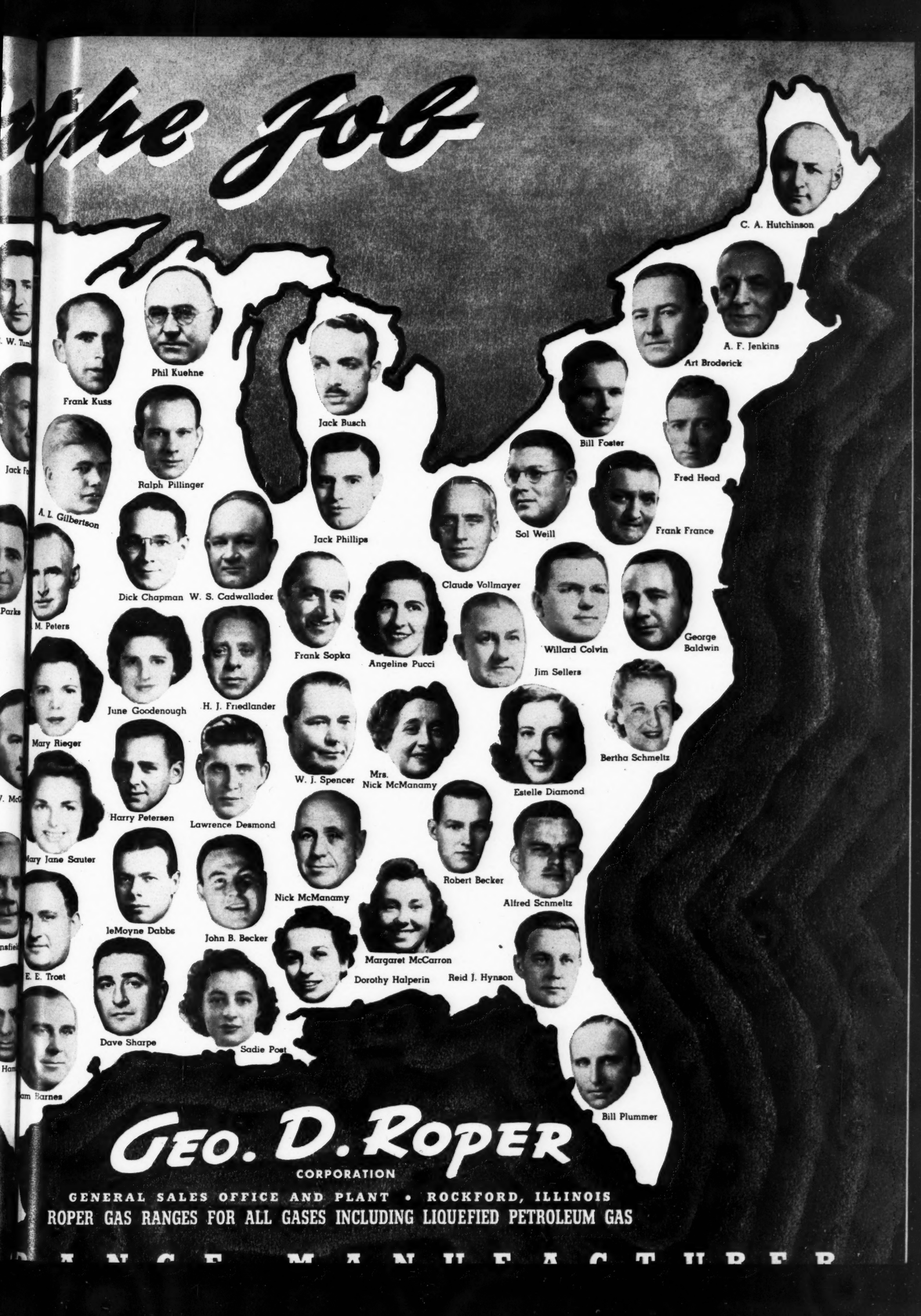
Were Ou

Representatives of the Geo. D. Roper Corporation are remaining "in the field." Our representative will call on you as always. He will remain on the job to help you solve sales and delivery problems in the best possible manner. He will remain on the job to act as a sounding board for the helpful ideas and suggestions you want to pass on to us. He will remain on the job to let you know that your business is appreciated. And, of course, this goes for the entire Rockford organization, too.


the Job
C. A. Hutchinson
A. F. Jenkins
Art Broderick
Phil Kuehne
Frank Kuss
Jack Busch
Bill Foster
Fred Head
Ralph Pillinger
A. L. Gilbertson
Jack Phillips
Sol Weill
Frank France
Dick Chapman
W. S. Cadwallader
Claude Vollmayer
M. Peters
Frank Sopka
Angeline Pucci
Willard Colvin
George Baldwin
Jim Sellers
June Goodenough
H. J. Friedlander
Mary Rieger
W. J. Spencer
Mrs. Nick McManamy
Bertha Schmeltz
Estelle Diamond
Harry Petersen
Lawrence Desmond
Mary Jane Sauter
Robert Becker
Alfred Schmeltz
Nick McManamy
leMoyne Dabbs
John B. Becker
E. E. Trost
Margaret McCarron
Dorothy Halperin
Reid J. Hynson
Dave Sharpe
Sadie Post
Bill Plummer
GEO. D. ROPER
CORPORATION
GENERAL SALES OFFICE AND PLANT • ROCKFORD, ILLINOIS
ROPER GAS RANGES FOR ALL GASES INCLUDING LIQUEFIED PETROLEUM GAS

"Split Payment Plan" Increases Sales

THE perennial objection to greatly increased gas bills following the Christmas holidays and continuing through January and February (when customers' funds are often below average) has been, in part, if not largely remedied by a "split payment plan" developed by L. T. Sogard of the billing department of the Citizens Gas & Coke Utility, Indianapolis, Ind. Not only has the plan stifled many objections to "lump payments" of gas bills, but since its adoption the company has noted a marked increase in the sales of gas conversion burners, central gas heating plants, and all gas appliances.

Despite the usage of the selling point that gas heating is paid for after it is used, rather than before, such as is the case of other fuels, Mr. Sogard explains that because nearly 60% of the season's fuel is consumed during December and January in Indianapolis, consumers invariably object to the gas bills for these months resulting in a tendency to reduce conversion sales.

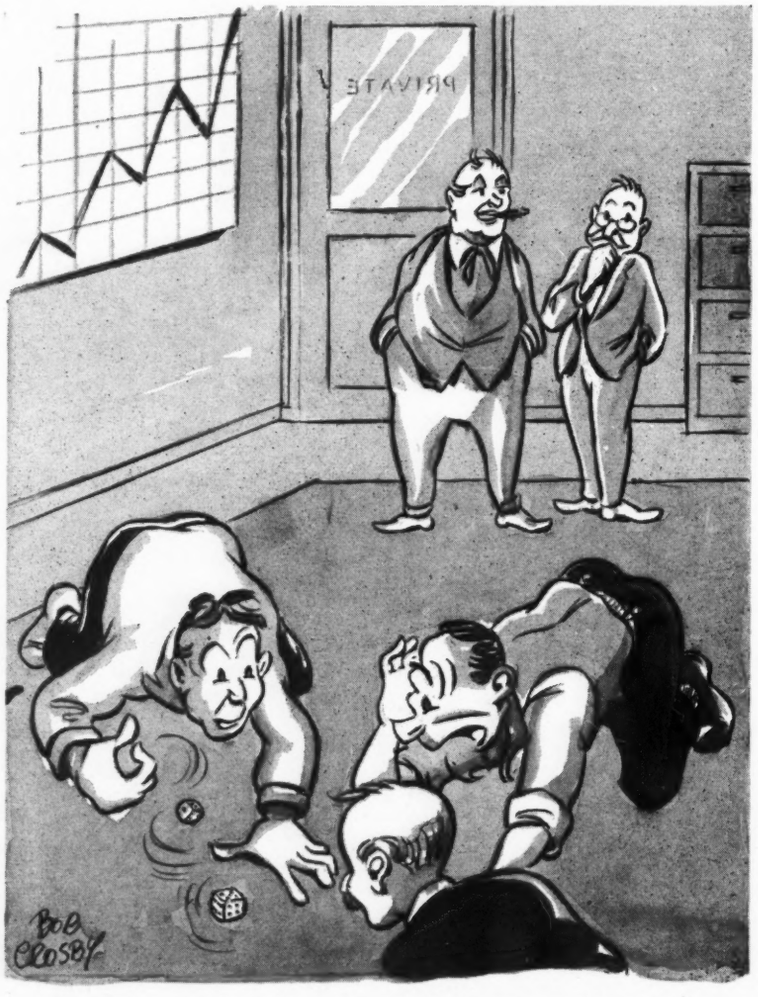
Mr. Sogard's "Budget Payment Plan," now extended to all househeating customers of the company, simply spreads heating costs over the entire year. For example, a customer, converted to gas heating, who spends $100 a winter for heating his home and $4 per month for cooking and water heating may pay this $148 gas bill for the year at the rate of $12.50 per month.

Almost 95% of the utility's gas conversion consumers prefer this plan and are billed 12 times a year, the period beginning in June. If more gas was used than had been expected, the slight extra charge is added to the May bill and if less gas is used the customer is extended credit for the next year.

The Indianapolis utility salesmen have been trained to suggest the plan to new customers on the basis that it is a practical means of providing automatic gas heat without strain on the budget. These salesmen report that customers they have contacted prefer the plan for it enables them to know exactly how much their gas bill will represent in their budget from month to month, in the same way as payments on a home, food bills or water bills.

Mr. Sogard points out that an effective sales angle can be developed by pointing out to the customer that his heating bills are in a sense "paid in advance" by the use of the budget system and he is insured against being caught "short" as he might be if oil or coke were delivered to his home.

DOTTED LINE ROSCOE . . . . . By Bob Crosby



"The boys are tryin' to decide who gets to sell the eight refrigerators comin' in next month."

Largest Fluorescent Lamp Factory Uses Natural Gas

More than 40,000 persons attended the recent dedication of the world's largest fluorescent lamp factory in Fairmont, West Virginia. The $3,000,000 plant which uses natural gas for heating and process work will eventually employ 1000 persons and turn out 50,000 lamps a day.

Natural gas was selected as a fuel because it may be controlled to give almost any degree of heat and is free from impurities that might be harmful to glass during manufacture. Natural gas is also used for heating the building. Gas unit heaters spotted in various locations supplement the central heating system, which is also gas fired. Ultra-modernistic, the new factory has no windows, year-around air conditioning and fluorescent lighting.

The plant is served by the Pittsburgh and West Virginia Gas Co., a subsidiary of the Philadelphia Co.

Gas Range Sales Meetings In Western Pennsylvania

More than 1200 gas range dealers and salesmen in western Pennsylvania districts attended seven dinner-sales meetings held in September to obtain complete instruction and information on the 1941 October Gas Range Campaign sponsored by the Gas Appliance Promotion of the Natural Gas Companies in the western Pennsylvania area.

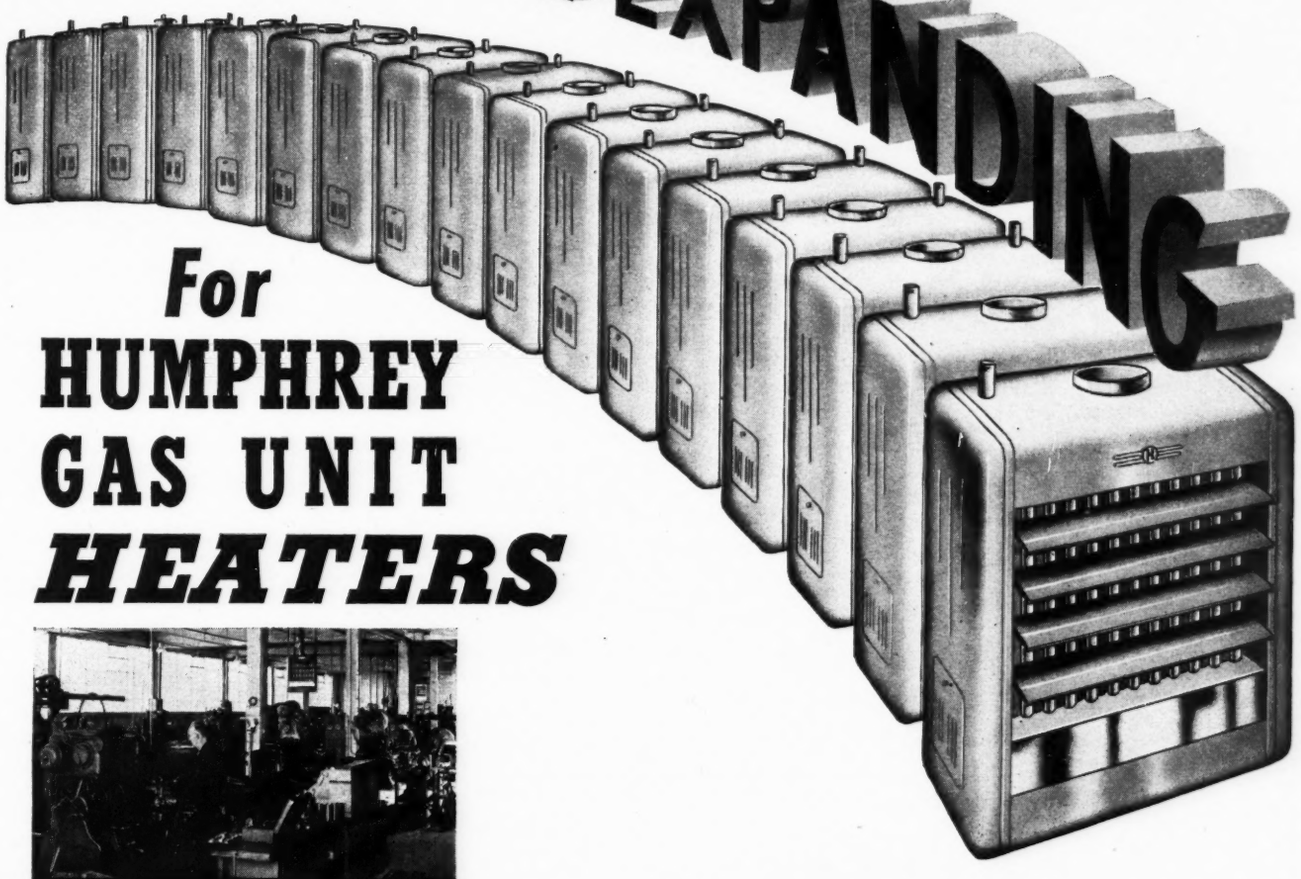
Sales meetings convened at Washington, Pa., Sept. 17; Beaver Falls, Pa., Sept. 18; Greensburg, Pa., Sept. 19; Altoona, Pa., Sept. 22; Kittanning, Pa., Sept. 23; and a final two-day session in Pittsburgh, Sept. 24-25. Alton B. Parker, national sales counselor for the Association of Gas and Equipment Manufacturers of New York City, spoke on proper cooking of foods at all of the sessions.

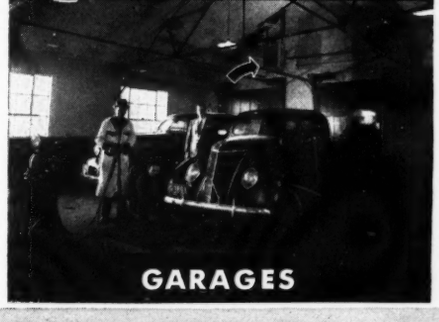
Council Bluffs Gas Co. Is Granted 15-Year Franchise

The Council Bluffs Gas Co., Council Bluffs, Iowa, has been granted a 15-year natural gas franchise in return for an annual franchise tax of $7500 and a continuation of existing rates. The vote was 3376 for the franchise, 1858 against. Carl M. Stephens is manager.

MARKETS ARE EXPANDING

For HUMPHREY GAS UNIT *HEATERS*





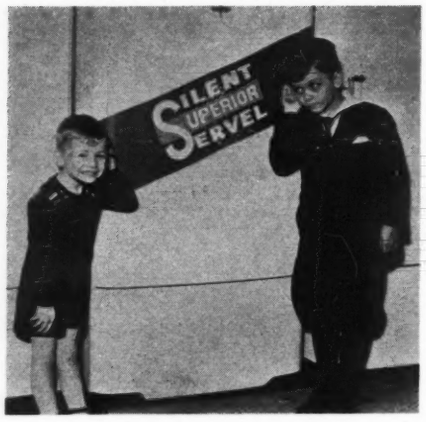
New factories . . . reconditioned factories . . . super stores . . . new buildings of every type . . . all over the nation there's a demand for heat facilities that can be quickly, easily, and inexpensively installed.

Send today for the new FREE Humphrey 1941-42 Sales Help Portfolio that includes complete ammunition for selling the profitable expanding market this year.

Sell Humphrey Gas Unit Heaters to satisfy this demand in your city. These fine Forced Air heaters with capacities ranging from 65,000 B.T.U. to 400,000 B.T.U. per hour are unsurpassed load-builders.

Gas loads built by Humphrey Gas Unit Heaters are substantial and permanent. Get YOUR share of this profitable business.

GENERAL GAS LIGHT COMPANY
KALAMAZOO, MICHIGAN
23 Warren St., NEW YORK CITY 2nd Unit Santa Fe Bldg., DALLAS 475 Eleventh St., SAN FRANCISCO



Youngster's Letters Pave Way For Father to Close Sales

Clayton Baumann, small son of Roy Baumann, Servel Electrolux dealer-salesman in Chicago, recently turned out an unusual direct-mail sales promotion campaign which, his father says, actually paved the way for several sales in addition to arousing a great deal of curiosity, interest and comment.

"Helo, foaks," the letter began. "Daddy is bizy maiking sails, so i must rite this tyme." Then the letter went into detail pointing out the merits of Servel Electrolux and revealed that Mr. Baumann expects to sell $250,000 worth of gas refrigerators this year if his prospects cooperate. Clayton signed it in a childish scrawl.

More than 3000 persons received the letter which, although full of misspelled words, was plain enough to put across several good selling points in a manner which prospects are likely to remember. Clayton and Danny, his older brother, are shown "listening" to the permanently silent Servel Electrolux gas refrigerator sold by their father.

■ ■

Pittsburgh Newspaper Traces History of Natural Gas

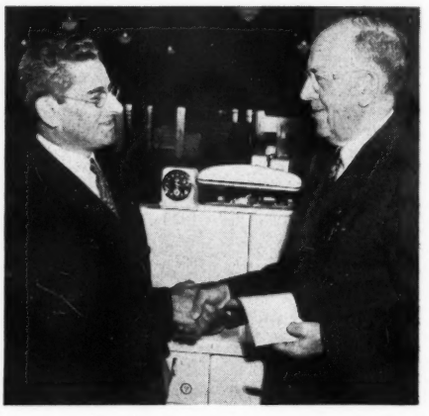
Importance of the gas industry in Pittsburgh's industrial success received notice when the centennial edition of the *Pittsburgh Sun-Telegraph* featured 28 column inches of gas copy and three advertisements in the four-page industrial section.

Gas advertising in the 128-page centennial edition comprising a full-page insertion by natural gas companies stated, "The first modern natural gas system was built at Titusville, Pa., in 1872, the first community piped for the use of natural gas." Several ads were inserted by Pittsburgh Equitable Meter Co., Merco Nordstrom Valve Co. and Hamburg Brothers of Servel Electrolux.

■ ■

New Mexico Gas Co. Aids Sale of Defense Bonds

J. R. Cole, vice president of the New Mexico Gas Co., Santa Fe, N. M., has announced that his company will cooperate with the defense program by placing defense savings stamps on sale at the company offices at 132 East Marcy street. Mr. Cole said that he felt the convenience in buying stamps would materially aid the sale to the public.



S. C. Singer (left) congratulates W. M. Ellis

W. M. Ellis, CP Salesman, Wins Trip to Atlantic City

S. C. Singer, manager northern division. Southern California Gas Co., recently presented W. M. Ellis, sales representative, with tickets entitling him to an all-expense trip to Atlantic City, N. J., this award having been made by the American Gas Association of Equipment Manufacturers to Mr. Ellis for selling more Certified Performance gas ranges than any retail salesman in the United States.

Mr. Ellis, a resident of Glendale, will leave on this trip October 15, and while in Atlantic City will attend the A. G. A. convention.

■ ■

Mineral Wool Salesmen to Tip With Defense Stamps

Recommendations have been made by the Defense Co-operation Committee of the National Mineral Wool Association to have the association's field engineers and all traveling salesmen of member companies stop using coins for tipping and, instead, give U. S. Defense Savings Stamps for services rendered.

Books of stamps, which come in 10 and 25¢ denominatiins and thus make possible tips of 10¢, 20¢, 25¢, are to be furnished the engineers and salesmen in proper quantity before the start of their trips. Local building supply dealers handling mineral wool and representatives of applicator companies, which insulate residences by blowing mineral wool into wallspaces and ceilings, will also be urged to adopt the same practice.

■ ■

Portland Utility Issues "On the Job" Promotion

The Portland Gas and Coke Co., Portland, Ore., is now issuing a monthly highlight review titled "On the Job" in which it gives brief notes on main facts concerning the growing use of gas service in that community. The September issue of "On the Job" reviewed some of the more recent installations and conversions made by the company, of which R. C. Barnett is vice president and general manager.

■ ■

Ohio Fuel Gas Co. Buys Gas Distribution Plant

The Ohio Fuel Gas Co., Columbus, Ohio, has purchased the gas distribution plant of the Barnesville Development Co. in Barnesville, Ohio. The transmission line between Bethesda and Barnesville was also purchased. Price of these properties was $92,000, with an additional $33,000 for other transmission lines duplicating those of Ohio Fuel Gas Co.

TITAN

CONSISTENTLY
GOOD PERFORMANCE

TITAN SNAP ACTION
THERMOSTATS

THE TITAN VALVE AND MANUFACTURING CO.
9913 Elk Avenue
CLEVELAND, OHIO

WEDGEWOOD *Quality* GAS RANGES

A WISE INVESTMENT —FOR YEARS TO COME

WEDGEWOOD'S **superior quality** insures extra long-life service. Through equally superior cooking features, life-long savings in food, fuel, time and money are constantly enjoyed. Lifetime satisfaction and continuing economy result from WEDGEWOOD'S superior cooking performance. Considered from every standpoint, WEDGEWOOD Gas Ranges are truly a wise investment for the years to come.

★

Outstanding
WEDGEWOOD
Features Include:

Astogril Broiler

Makes Broiler Meats Better Tasting

★

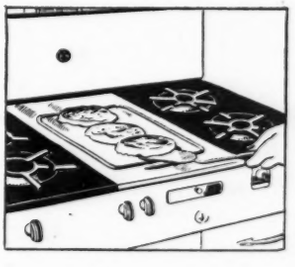
Low-Temperature Oven

Better Roasts, Less Meat Shrinkage

★

Top Griddle

Ideal for Hotcakes and Frying or as Plate Warmer



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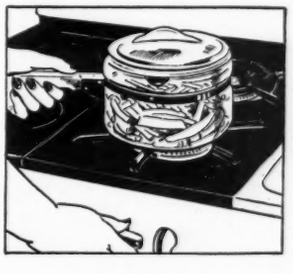
Speed-Simmer Burners

Cooks Vegetables With Little or No Water



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Gas THE MODERN FUEL

WEDGEWOOD GAS RANGES MAKE NEW FRIENDS FOR GAS

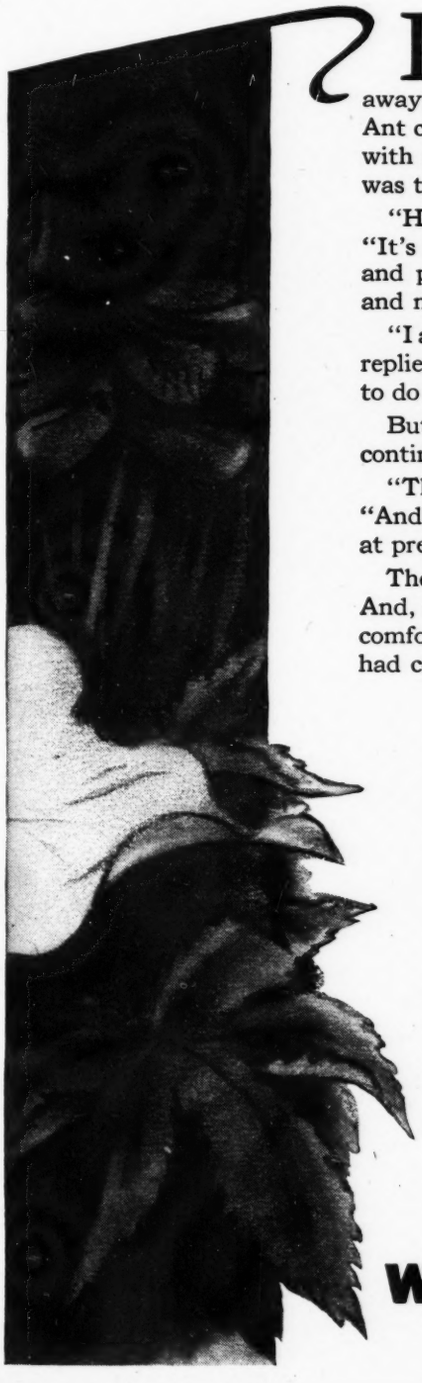
WEDGEWOOD

THE MODERN GAS RANGE

JAMES GRAHAM MANUFACTURING CO. • Los Angeles - San Francisco - Newark, Calif. - Portland, Oregon

Fable

of the Grasshopper and the Ant



IN A FIELD, one fine summer's day, a Grasshopper was fiddling away without a care in the world. An Ant chanced to pass by, bearing along with great effort a grain of wheat he was taking to his nest.

"Ho, Ant!" called the Grasshopper. "It's too hot to work. Why not come and play with me, instead of toiling and moiling in that way?"

"I am laying up food for the winter," replied the Ant, "and recommend you to do the same."

But the Grasshopper laughed and continued to fiddle and tap his feet.

"The winter's far away," he said. "And, besides, there's plenty of food at present."

The Ant went on about his business. And, when winter came, he lived very comfortably on the corn and grain he had collected during the summer.

The Grasshopper, on the other hand, found himself with no food. And soon he died of hunger.

* * *

It's easy to get accustomed to good seasons, even though, down deep, we know they cannot last.

Today the appliance business is good. Demand has increased sharply. Supply lags. It's a "seller's market" and with it comes the temptation to tread water with advertising . . . to mark time with sales effort.

Experienced Gas Company executives know, however, that abnormally good seasons are invariably followed by normal ones. That, sooner or later, a "seller's market" must again give way to a "buyer's market." And, when that happens, the unknown, forgotten "grasshopper" products will be the hard-to-sell products.

SERVEL
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Association Abstracts

ON THESE PAGES are published abstracts of many of the papers presented before the 48th Annual Convention of the Pacific Coast Gas Association and the Mid-West Gas School and Conference held last month. These abstracts are published not only in an effort to save the reader's time, but also to furnish him with capsule information regarding the current contributions to the programs of the various gas associations. The publishers of GAS will gladly forward any requests for further information to the authors of the papers which are abstracted in this department.

• **ABSTRACTS of papers presented before the Pacific Coast Gas Association's 48th Annual Convention, Del Monte, Calif., Sept. 10-12.**

Corrosion Coupons and Pipe Life Predictions—W. R. Schneider, Bureau of Tests & Inspection, Pacific Gas & Electric Co., San Francisco. Calif. The result of 10 years' experience in the use of "Corrosion Coupons" or "Corrosion Test Plates" on the gas lines of the Pacific Gas and Electric Co. and in the estimating of the pipe life by the measurement of the corrosion pits on these coupons. The methods of installing, cleaning and measuring the coupons are given. The wide variation and frequent contradictory predictions of pipe life that result from calculations based on single coupons exposed for one year only are pointed out, and the necessity of studying a series of coupons over a period of years is shown. The pit depth on the corrosion coupon is taken as a measure of the soil corrosivity during one year only. The soil's activity in increasing the depth of an existing pit each year is evaluated according to a parabolic equation. The various annual contributions of the soil corrosivity to the pit depth are accumulated, and the pipe life is forecast from the average pitting rate thus obtained.

Methods and Specifications for Testing Vent Cowls—C. A. Thorp. Southern California Gas Co., Los Angeles, Calif. Recommended installation specifications, as well as municipal ordinances, require that the vents for gas appliances be extended above the highest point of the roof with some type of cowl used as a terminal for the vent. When this is done, the installation is often unsightly, hence the ordinances and specifications are frequently disregarded with the result that the venting performance is impaired. Although claims are made that certain of the cowls available perform under the more adverse conditions of installation, municipal bodies are generally reluctant to alter the existing ordinances since they have no simple means of testing and comparing the performance of the various types of cowls. This paper presents for discussion a test procedure developed in an attempt to establish a method of test and minimum specifications which would be satisfactory for all types of vent cowls.

Uses of Gas in the Shipbuilding Industry—F. J. Mahr, Pacific Gas and Electric Co., San Francisco, Calif. The seven major shipbuilding yards on San Francisco Bay will use as practically their only fuel. approximately 3.439,600 M c.f. of natural gas in 1941. Gas consumption will be materially greater in 1942. Almost every known industrial heat application is included, many of which are described, as are the various stages of construction of a steel ship.

High Pressure Absorption of Natural Gasoline as a Means of Natural Gas Conservation—E. J. Squire, Shell Oil Co., Los Angeles, Calif. Approximately 10% of the gas produced in the State of California is used as fuel for the manufacture of natural gasoline and this percentage will increase very materially as pressures decline in the fields, particularly if the plants continue to absorb at low pressure. At present, this amounts to some 3,000,000 000 cu. ft. per month or roughly one-third of the quantity used for domestic purposes throughout the state. With this in view the Shell Oil Co. with the cooperation of the Pacific Lighting Corp. and Southern California Gas Co. is pjoneering in this one phase of oilfield conservation by converting its Ventura natural gasoline plant from low pressure to high pressure absorption. The plant changes and method of operation are described. No general statement can be made regarding the reduction in fuel when converting a plant from low pressure to high pressure absorption because of the widely differing conditions encountered in each individual case. However, the saving may be expected to range from about 10% to 50% of the total plant fuel.

Uses of Gas in Army and Navy Establishments—Stanley Wright, Pacific Gas and Electric Co., San Francisco, Calif. Accurate estimates of gas consumption in army encampments are difficult to develop, as most of the camps have been operating for only a short time, and personnel and facilities change and vary rapidly. A survey of Pacific Coast camps gives data on gas used per man per month in mess halls, barracks, ratio of connected loads for various purposes, ratio of demand to connected load and ratio of peak hour to 24-hour load.

Gas in the Aviation Industry—E. H. Adler, San Diego Gas and Electric Co., San Diego, Calif. Gas equipment for aviation plants has kept pace with the general needs of these plants, but has not been modernized or specially developed for them. Now is the time to study the present and future requirements of the aviation industry, and supply it with up to date gas utilization apparatus, as the present volume of aviation production will continue for many years and beyond the termination of the current defense effort.

A Proposed Plan of Meter Routing—M. G. Thomas, Southern California Gas Co., Los Angeles. Calif. This paper deals with a procedure for controlled work assignment and the practical adjustment of meter growth. When these phases of the general problem are solved, co-ordination of billing, bookkeeping, and collection activities becomes a relatively simple matter. Consideration must be given to all conceivable conditions or combinations of conditions which determine the number of meters a man can read in a day.

Forecasting Winter-Day Load in a Natural Gas Territory—P. E. Beckman, J. J. Pugh and E. G. Arnedt, Pacific Gas and Electric Co., San Francisco, Calif. Variables

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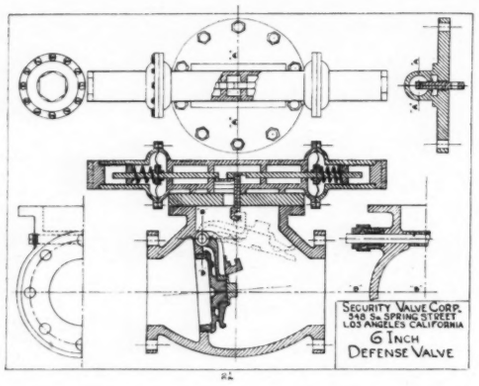

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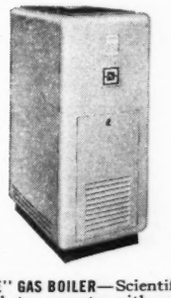

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affecting firm (essential) gas are investigated in each operating area to determine their influence on load requirements. The behavior of the most elusive of these variables, the daily use per average customer, is studied at two datum temperatures, one being the average normal winter temperature for the focal period December to February, inclusive, the other being the lowest daily mean temperature on record. Values at the two datum temperatures are obtained graphically by projection of plotted data, defining the relation between use per customer and mean temperature.

Future growth in the use per customer variable is shaped by means of a "control" which provides (1) a relative ceiling for this use and (2) an ultimate relationship of the increase in use per degree drop below normal winter temperature. The data employed for the "control" are obtained from an older operating area (within the territory) whose appliance and usage "saturation" makes it adaptable for this purpose.

Leakage Control—V. J. Robbins, Southern California Gas Co., Los Angeles, Calif. A discussion of the problem of accumulating data about isolated leaks in order to determine when main replacements are necessary and when individual repairs will remedy the condition less expensively. The methods of determining main conditions throughout the system from "Underground Pipe Inspection Reports" made by field crews, and of utilizing these reports to establish the limits of main replacements are described in detail. A brief explanation is given of leakage difficulties which may be caused by shifting anodic areas when partial replacement is made, and a possible solution is outlined.

Leakage-Pressure Relationship for Buried Distribution Mains—L. R. Pickup, Southern California Gas Co. A review of treats the data obtained from tests conducted on an abandoned 4-in. distribution main, and presents evidence showing that leakage from a distribution main is not directly proportional to gauge pressure.

A formula is developed for the leakage from the main; namely, Leakage=CP^n. It is concluded that condition of soil, depth of main, and type of surface cover over the main control the exponent of the leakage formula and that the condition of the main will control the constant.

The Progress in Automotive Construction Equipment—L. F. Dishman, Southern California Gas Co. A review of automotive construction equipment operated by that branch of gas distribution organizations having to do with mains, services, large industrial meters, regulators and related facilities covers the changes and progress of the past forty years.

Demand Recorders for Displacement Meters—Frank R. Bater, San Diego Gas and Electric Co. Describes two types of portable recording instruments which are suitable for recording the registration of most displacement meters. For a great many purposes, both instruments possess many advantages over the conventional volume and pressure recorder and the ordinary complaint meter.

One is a dry battery operated magnetic recorder that is easy to construct and is extremely flexible in application. The other is a mechanical recorder which incorporates a number of novel features and is designed especially to produce a satisfactory record over extremely wide ranges of flow. Both instruments may be installed without interrupting service to the customer or removing the meter index.

Fuel Gas Calorimetry — Water Flow Method—A report of the subcommittee on Gas Calorimetry Standards by Guy Corfield, Southern California Gas Co., chairman. Includes a discussion of fuel gases, their combustion and heating value; principles of water flow calorimetry; the standard water flow gas calorimeter assembly, and its method of operation; reasons for, and development of the various corrections that are applied during a heating value determination; numerical value of humidity corrections for a typical natural gas; description, specifications, and arrangement of equipment; and complete and detailed operating instructions for standardization and maintenance of apparatus, conduct of the actual test, and entry of records and computations.

Natural Gas Production and Utilization in California—Roy M. Bauer, Southern California Gas Co., Los Angeles, Calif. Sets forth production and utilization statistics from 1906 to 1940, inclusive, together with supporting tables and charts.

Facts and Figures About Liquefied Natural Gas—J. L. Oberseider, Southern California Gas Co., Los Angeles, Calif. In order to meet peak-load demands in the natural gas industry, a type of storage was needed wherein the necessity of high pressure could be removed, the use of large holders rendered unnecessary, and the concentration of the maximum number of cubic feet of natural gas in the minimum space accomplished. Liquefied natural gas meets these requirements. It can be stored in comparatively small holders, 600 cu. ft. of the gas being concentrated into one cubic foot of liquid, at essentially atmospheric pressure, if the temperature is kept in the vicinity of —258° F.

Laboratory experiments and pilot plant operation were undertaken by the Hope Natural Gas Co. As a result, the cascade system of liquefaction was chosen. The temperature is progressively reduced by using: first an ammonia condensing circuit, then an ethylene condensing circuit, and finally a natural gas condensing and expansion circuit. Monoethanolamine and diethylene glycol were picked for complete carbon dioxide removal and Activated Alumina for water and lubricating oil absorption. A steel with an 0.09% carbon and a 3½% nickel content was selected for the inner sphere of storage tanks. These tanks consisted of two concentric spheres separated by 3 ft. of cork insulation with a heat transfer rate of 0.4 B.t.u. per sq. ft. per hour per degree F., formed in the lower half, to carry the load of the inner tank and its contents, and granulated in the upper half. For temperatures below —50° F. piping, valves, exchangers, etc., of copper or stainless steel were indicated. A high nickel and chromium welding rod was developed for welding.

A plant was built by the East Ohio Gas Co. in Cleveland, Ohio, to liquify 4,000.000 cu. ft. of natural gas per day, using 3250 h.p. divided up into 600 h.p. for raw gas compression, 950 h.p. for recycling gas compression, 1250 h.p. for ethylene compression and 500 h.p. for ammonia compression. Storage capacity of 150.000,000 cu. ft. of gas (equivalent of 1,800,000 gals. of liquid) and regasification of 3,000,000 cu. ft. per hour were provided.

The initial cost of the Cleveland plant was about $1,250,000—$260 000 for engines with foundations and buildings, $420,000 for spherical storage tanks and piping and the remainder for boiler plant, piping, cooling

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tower, heat exchangers and auxiliary equipment. The operating cost will be somewhere between $0.371 and $0.244 per M c.f. about one-third of which will be for labor and the remainder for materials.

The plant is assertedly a satisfactory substitute for a new transmission line costing $2,500,000. There seems to be a definite place in the industry for a plant of this type, and it seems to particularly suit a company with a long supply line and a heavy house-heating load. (*GAS*, Nov., 1940, pg. 28.)

Developments in Pipeline Construction—B. M. Laulhere, Jr., Macco-Robertson. Clearwater, Calif. Contains a brief history of the early day pipe line construction practices and indicates the improvements which have led to the present stage of development in the field of pipe line construction.

Wet excavations can be handled by the Wellpoint system of pre-drainage which eliminates the necessity of sheeting in many cases. Data on a trench Wellpoint installation is presented in this paper.

The respective advantages of the roll welding and "stove-pipe" methods of construction are discussed. Tube-turns, expansion joints, "wrinkle-bending," fire bending and cold bending have been and are employed in making directional changes in pipelines. Each method has its own particular advantages.

The more important factors concerning the application of the protective coating on pipe lines are considered as well as the facilities available for applying all types of coatings.

The desirability of a qualified inspector on the job is given consideration. The elimination of misunderstandings between the constructor and owner will help in speeding up the progress of any job.

Mechanism of Flow of Fluids Through Orifices—Julius M. Naiman, Edmund Burke Co. To coordinate available experimental data on orifice coefficients it would be very useful if the mechanism of flow of fluids through orifices were known.

Based on certain physical concepts as to the effect of the orifice plate on the path of fluid flow, the author has attempted to establish the required pressure and velocity distribution and the shape of the effective path of flow or of the effective stream lines which would satisfy Bernoulli's theorem or the energy balance law, the flow continuity law and the centrifugal force law for curved streamlines.

The Cathodic Protection of Bare Steel Pipe by the Use of Zinc or Aluminum—A. C. Alter, Southern California Gas Co., Los Angeles, Calif. Discloses the results of two separate identical experimental zinc-iron and aluminum-iron couple installations made in Southern California soils, in order to determine whether or not an economical steel-zine or steel-aluminum ratio can provide a sufficient current density to cathodically protect bare steel pipe. These data show the variation in anode and cathode weight losses with a change in soils and the variation in the voltage of the cathodes, referred to ground electrodes, with soil type and time of burial.

A Method of Protecting Gas Systems Against Stray Current Electrolysis—D. B. Larson, Portland Gas & Coke Co., Portland, Ore. In general there have been two schools of thought with respect to the problem of electrolysis protection for underground pipe lines: (1) protection of the system by careful insulation, so that stray currents would be prevented from using pipe lines as a part of their return path; (2) permit the stray currents to travel on the pipe lines and to bond the lines to the electric systems at suitable locations, thereby eliminating possible damage to them.

This paper favors using one or the other or a combination of both as the field condition requires.

The first installation of this kind of protection was made in the city of Portland in 1928. At that time a portion of the main was insulated immediately under a car line and about 10 feet beyond the tracks in each direction by installing the main inside a wooden box filled with asphalt. A shield of junk pipe was placed over the live line for a distance of about 30 feet each way from the insulated section. In some cases the shielded section was extended as much as 100 feet from the tracks. In the years which immediately preceded the adoption of this policy there was an average of from 10 to 15 cases of electrolysis damage annually.

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• ABSTRACTS of papers presented before the Mid-West Gas Association School and Conference, Iowa State College, Ames, Iowa, September, 1941.

Experiences With Odorization — Geo. B. Johnson, superintendent of production, Minneapolis Gas Light Co., Minneapolis, Minn. Discusses odorization experiences using both Calodorant and Pentalarm and various types of injection equipment. Calodorant used at 2 gals. per MM c.f., and Pentalarm at 0.7 lbs. MM c.f. Both odorants equally satisfactory in imparting a satisfactory odor to the gas.

Industrial Process Applications—O. S. Hubbard, Hubbard Sales Co., Kansas City, Mo. The distant and local operating personnel in every small gas town are too often, through lack of familiarity with industrial equipment available, unable to properly defend themselves in a discussion relating to industrial applications or to properly present the possibilities of industrial applications. There are a few basic principles in industrial application, and these principles apply to any application, which would enable every operating man to be able to hold his own in the greatest number of cases, and even in those cases where critical technical questions are involved, permit him to obtain the correct information and enable him to get the help required for the job. These principles are discussed.

Field Testing of Large Industrial Meters—T. G. Kimball, industrial meter superintendent, Iowa-Nebraska Light & Power Co., Lincoln, Nebr. A brief discussion of the field testing of large industrial meters by critical flow with the use of high pressure gas, and low pressure with the use of an air blower and 2-in. low pressure prover.

Considerations in Meter Setting—D. R. Putnam, general superintendent, Northern States Power Co., St. Paul, Minn. A general discussion of meter setting covering records, transportation, sets and unlocks, locking and removing, periodic changes, neck leaks and gaskets.

Experience With Nine Foot Reverse Flow Water Gas Machine—George G. Dormer, plant superintendent, Wisconsin Power and Light Co., Beloit, Wis. Wisconsin Power and Light Co. were faced with the problem of how to best reduce gas production cost: (a) By using heavy oil in present

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equipment, or (b) By installing a new 9-ft. water gas set designed to operate with heavy oil. It was decided to install a 9-ft.x8-ft.x8-ft. Semet Solvay Reverse Flow water gas set, and in February, 1940, completed this installation consisting of a standard generator, Reverse Flow carburetor and super-heater, a cone bottom wash box, a three-way valve with quick opening door, a cast iron back-run pipe, and a UGI automatic control, together with the necessary oil pumps and heaters required for heavy oil.

Operations are described in detail and a summary given of difficulties encountered, anticipated difficulties that did not develop and changes or additions that would be made if another set were built.

Accuracy in Diaphragm Meters—Allen D. MacLean, vice president and chief engineer, Pittsburgh Equitable Meter Co., Pittsburgh, Pa. A discussion of the mechanical causes for diaphragm meter inaccuracies. Every man concerned with measurement should familiarize himself with these effects and for his own situation work out methods to give him the best possible in meter accuracy with a minimum outlay for repairs. The "perfect square" analysis, coupled with an understanding of the principle of the meter, should result in good measurement at low cost.

Unaccounted For Gas—Methods of Detection—A. F. Parmelee, Davis Emergency Equipment Co., Kansas City, Mo. A discussion of the various methods of leak detection, as follows: (1) Shut-in or block district metering; (2) district master metering; (3) pressure changes in send out; (4) Bar testing; (5) Odorization; (6) Man hole and underground vault and basement surveys; (7) sound instruments; (8) vegetation surveys; (9) combustible gas indicator surveys. Organized systematic programs of leakage survey work has progressed rapidly in the past several years. The speed and efficiency of some of the latter methods is well proven. The savings in actual cost by reducing gas unaccounted for and eliminating more of the explosive hazards as well as the added convenience to customers and distributors alike, make it possible and almost necessary that a distributing organization incorporate these methods.

Gas Engines—D. W. Reeves, industrial sales manager, Oklahoma Natural Gas Co., Tulsa, Okla. A general discussion of gas engine power, covering the sizing, installation, cooling and servicing of gas engines; the convertible diesel-gas engine, efficiencies of operation; probable life of units. A typical economic comparison of gas engine power vs. purchased electric power is worked out in accordance with the method recommended in the A.G.A. Gas Engine Handbook.

Improving Meter Accuracies—A. H. Abbott, gas engineer. Northern States Power Co., Minneapolis, Minn. It is quite necessary to analyze meter performance from the test data both as to correct meters and net error, and it is easy to be misled by a satisfactory net error. From such analysis it will be possible to classify the meters or performance so that various treatments can be applied to the individual classes or conditions. A good way of observing the test data of meters is from the ordinary meter accuracy report which tabulates the meter tests by years since last test. This can be expanded for different classes of meters and the information analyzed accordingly. It is quite essential to realize that the money which is spent for meter repairs not only goes to keep the meters operating but to maintain a high degree of accuracy, and it is necessary to have some kind of reports in order to know what results are obtained and whether the trend is in the right direction on accuracy changes.

Heating Appliance Controls—H. C. Carlson, Jr., Minnapolis-Honeywell Regulator Co., Minneapolis, Minn. Outlines steps in the development of the thermostat for space heating appliance control. Next, briefly describes the details of operation of a few of the forced warm air control systems recently developed, among which are: two-speed fan control with single stage firing; two-stage firing with single speed fan operation; two-stage firing with two-speed fan; two-stage thermostats operating through two limit controls on single stage fired intermittent gas installation.

Gas Appliance Venting—John C. Mueller, Payne Furnace & Supply Co., Inc., Beverly Hills, Calif. Gas appliances venting has one prime function, to carry away and discharge the combustion products from the appliance to which attached. The performance of this function is made necessary by the presence of large quantities of water vapor and the possibility of carbon monoxide in the products of combustion. The energy available to produce vent action is relatively low and must be conserved by proper vent design. Six fundamentals of vent design are given, dealing with material, sizing, fittings and runs, draft hood, termination of vent, and durability.

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INDUSTRY *Personalities*

N. Henry Gellert, president of the Great Lakes Utilities Co., has been elected a member of the board of directors of the Seattle Gas Co., Seattle, Wash. Mr. Gellert is also president of the Atlantic Gas Corp. and the Pennsylvania & Southern Gas Co. He is a director of the American Gas Association.

• •

B. A. Seiple, vice president in charge of sales of the Jersey Central Power & Light Co., Asbury Park, N. J., has been nominated for vice chairman of the Residential Section of the American Gas Association for the year 1941-1942. Mr. Seiple has been a member of the Residential Section for a number of years. He joined Jersey Central in 1928, coming from Charlottesville, Va., where he was commercial manager for the Virginia Public Service Corp.

• •

Equitable Gas Co., Pittsburgh, Pa., honored recently six employees who have served the company a total of 265 years with a dinner in the Nixon Restaurant, Pittsburgh. These employees were **J. B. McClelland,** 50 years with the company; **J. R. Reese,** 46 years; **George R. Schaughency,** 42 years; **C. A. Machesney,** 40 years; **E. J. Gaul,** 39 years, and **R. C. Bovard,** 48 years.

• •

Mrs. Elinor Caffey is in charge of the newly-opened Anson, Texas, office of the Community Natural Gas Co. The Anson office will be under the supervision of the Stamford, Texas, district of the company, of which **W. M. Braymer** is district manager.

• •

H. W. Sweatt, president of the Minneapolis-Honeywell Regulator Co., has announced the addition to the executive staff of **Alfred M. Wilson** as assistant to the president.

After his graduation from Yale University, Mr. Wilson was employed by the Gillette Razor Co., Boston, Mass., and while there completed a course in engineering at Massachusetts Institute of Technology. After leaving the Gillette company he was associated with the American International Co. in New York and for the past several years has been with the J. & W. Seligman & Co.

• •

The Cooper-Bessemer Corp. has announced that **Gordon LeFebvre,** former American Locomotive Co. executive has joined that corporation as vice president and general manager. Mr. LeFebvre fills the vacancy created last May by the death of **Charles B. Jahnke. B. B. Williams** has been recalled to again take up active duties as head of the corporation and will retain the positions of president and chairman of the board of directors. Mr. LeFebvre and **L. F. Williams** were recently elected directors of the corporation.

GORDON LeFEBVRE

Mr. LeFebvre is a graduate of Virginia Polytechnic Institute and attended the United States Miliary Academy at West Point, N. Y. From 1913 to 1914 he served as a special apprentice and machinist for the Northwestern Railway. During the years 1915 to 1919 he was affiliated with E. I. Dupont de Nemours & Co. as machinist, master mechanic, and later, mechanical superintendent.

In 1919 Mr. LeFebvre became associated with General Motors Corp. at its Chevrolet division. He was in charge of construction of the Chevrolet plant and, later, responsible for production there, under **Wm. S. Knudsen.** He was then promoted to the position of vice president in charge of all General Motors Corp. activities in the Dominion of Canada, following which service he returned to the United States to assume the duties of vice president in charge of operations at the company's Pontiac division.

From 1932 to 1936, Mr. LeFebvre was a consulting engineer with offices in Detroit. Mich., and eventually became associated with A. J. Brandt, Inc. In 1937, he joined the American Locomotive Co. as manager of its Diesel Engine Division at Auburn, N. Y., and served in that capacity until his recent decision to acceptance of the position with The Cooper-Bessemer Corp.

• •

F. O. Suffron has resigned from the staff of the American Gas Association Testing Laboratories at Cleveland, Ohio, and will join his family on the West Coast. Continued ill health of members of his family had forced them to take up residence in California some time ago, and was a major factor in his decision to return to that state.

For the past 11 years, Mr. Suffron has been associated with the Testing Laboratories, holding various executive positions. As his first assignment, he took an active part in the Laboratories extensive pipe joint research project, and in requirements committee work. He was, at one time, engineer, in which capacity he was in charge of all research activities at the Laboratories. Later, he was supervisor of the Pacific Coast branch for three years.

• •

Col. Thomas Dobbins, medical director of Servel, Inc., Evansville, Ind., and veteran of the World War, has received orders from the war department to report to the Louisiana maneuver area for duty as staff officer at the headquarters of the second army.

During the first World War, Col. Dobbins saw service with the American armed forces in France. He was a member of the Fourth Division, regular army, which took part in

Digging long trenches, tearing up lawns, and breaking through concrete is the slow, expensive way to install pipe underground. With the Greenlee Hydraulic Pusher there's no digging of long open trenches, no pavement cutting, no tunneling, no backfilling, no repaving. Only a short trench need be dug to accommodate the pusher and pipe, and one or two men, pumping the handles, can easily develop hydraulic power to push pipe through the most difficult soil.

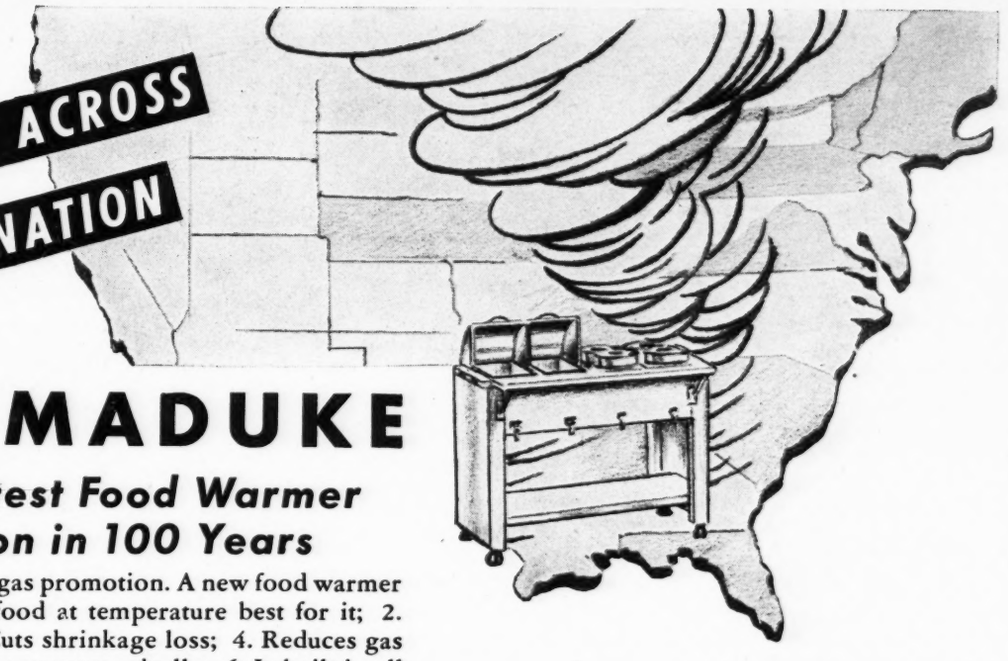
Powerful
Fast
Economical

Send for
NEW
S-117 BULLETIN

The Greenlee No. 790 Pusher shown above pushing 3-inch pipe under U. S. Highway 51, has capacity for 1¼ to 4-inch pipe, while the No. 795 Pusher, with a 75-ton hydraulic unit, will handle large drainage ducts, concrete sewer pipe, and pipe beyond 4-inch. Both Greenlee Pushers are built compactly into one unit, and are easily carried to the job and set up. No extra equipment of any type neded . . . the powerful hydraulic units do the actual pushing. Write today for more information on how these pushers can save you money on every job.

GREENLEE TOOL CO., 1700 Columbia Ave., ROCKFORD, ILL.

SWEEPING ACROSS THE NATION



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The Greatest Food Warmer Invention in 100 Years

Here's a "natural" for gas promotion. A new food warmer that: 1. Keeps each food at temperature best for it; 2. Maintains flavor; 3. Cuts shrinkage loss; 4. Reduces gas bill 2/3; 5. Installs more economically; 6. Is built in all sizes; 7. Is designed by a modern artist; 8. Is priced attractively low; 9. Burns free of odor and carbon monoxide. INVESTIGATE Thurmaduke. Send for Catalog "G" and special proposition for gas companies.

THURMADUKE IS PROTECTED BY U.S. PATENTS, SO BASICALLY NEW IS ITS PRINCIPLE OF OPERATION.

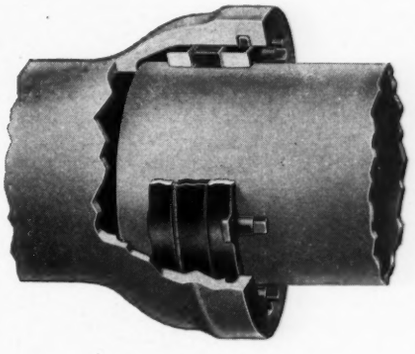
DUKE MFG. CO. • ST. LOUIS, MO.

DRESSER *Bellmaster* STYLE 85

The New CIP Mechanical Joint That's All Ready "To Go"

6" CIP Dresser Bellmaster Joint, Style 85. Comes "all in one piece," conveniently boxed for easy handling and stocking. Only a wrench required to install.

Easy to Handle • Quickly Installed Makes Joints Permanently Tight



Advantages at every step—before installation, during installation, after installation. That's why everyone's so enthusiastic about the new Dresser Bellmaster Joint. *Completely* factory-assembled, simplifies stocking and handling. Installed in from 2 to 5 minutes by ordinary workmen.

Note how the Bellmaster fits snugly *inside* the bell, offering complete protection against corrosion. See how this "floating joint," with its large-section resilient gasket, allows deflection of pipe in any direction and absorbs longitudinal movement caused by expansion and contraction. But get the facts first hand! Send today for a sample Bellmaster Joint. Use the coupon below.

DRESSER MANUFACTURING COMPANY • BRADFORD, PA.

In Canada: Dresser Manufacturing Co., Ltd., 60 Front St., W., Toronto, Ont.

DRESSER BELLMASTER New Saver of Time, Money, Handling CIP LINES

This Coupon Brings You A Full-sized Bellmaster.

Without cost or obligation to us send a full-sized Style 85 Bellmaster Joint for our inspection. We understand you will pay all shipping charges.

Name..... Address.....

Title..... City.....

Company..... State.....

FOR SIMPLER, FASTER, EASIER JOINING OF CAST-IRON PIPE

major engagements. He was wounded three times and was decorated by the French government with the croix de guerre with palm and the fourragers, for services in Belleau Woods. Later he was stationed in Germany with the army of occupation and afterward was sent to the Balkans as director for the American relief administration and the Red Cross.

• •

Jack Torbert, new business manager of the Wyandotte County Gas Co., Kansas City, Kan., has accepted the chairmanship of the water heater committee of the residential section of the American Gas Association. Mr. Torbert's committee work will start following the annual convention of the A. G. A. He will succeed **Bernard A. Seiple,** vice president in charge of sales, Jersey Power & Light Co., Asbury Park, N. J.

• •

A. J. Kiefer has been named assistant secretary of the Louisville Gas and Electric Co., and **L. E. Ackerson** has been appointed assistant treasurer. Mr. Kiefer and Mr. Ackerson have been employed in the accounting department of the company for the past 15 years.

• •

Arthur P. Hirose has been appointed director of promotion of the McCall Corp., publishers of "McCall's", "Blue Book", "Red Book" and other magazines, succeeding **Don Parsons,** who has resigned to become vice president of Federal Advertising Agency, Inc. Mr. Hirose has been director of market research for the McCall organization and will retain that position in addition to his new duties.

Carlos Shell, serviceman for the Arkansas-Louisiana Gas Co. Mt. Pleasant, Texas, for the past five years, has been appointed manager for the company office at Gilmer, Texas. Mr. Shell succeeds **Lynwood Collins,** who has been transferred to Shreveport, La.

• •

Curtis L. Wilson, who has been connected with the Montana School of Mines at Butte, Mont., for the last 20 years, has been appointed dean of the Missouri School of Mines and Metallurgy at Rolla, Mo., succeeding **Dr. William R. Chedsey,** resigned. Dr. Wilson is a member of the American Institute of Mining and Metallurgical Engineers, the American Chemical Society and the Montana Society of Engineers.

• •

The Bristol Co., Waterbury, Conn., has announced the transfer of **H. R. Bristol** from the Chicago office to the Boston office. Mr. Bristol has been employed in the engineering and sales departments of the company. **J. E. Booth** will take over the territory which was vacated by Mr. Bristol.

• •

The Burkay Co., of Toledo, Ohio, has announced the resignation of **H. S. Boyle** as vice president in charge of sales. Mr. Boyle was formerly sales promotion manager of Servel, Inc.

• •

Miss Ruth Clickner has been appointed home service director of the Beloit (Kan.) district of the Gas Service Co. Miss Clickner is a graduate of Kansas University where she majored in dietetics and home economics. Before joining the Gas Service Co. Miss Clickner did home service work in Joplin and St. Joseph, Mo., and Topeka, Merriam, Parsons, and Newton, Kan.

• •

Robert E. Ramsay has been elected president of the New Haven (Conn.) Gas Light Co., and will assume his new duties October 1st. He succeeds **H. R. Sterrett,** who retired because of ill health.

R. E. RAMSAY

Mr. Ramsay has been connected with the operation and management of gas properties for 32 years and has been associated with The United Gas Improvement Co. and its operating companies since 1910. He has been active in a consulting capacity in New Haven since 1927.

Mr. Ramsay became associated with The Philadelphia Gas Works in 1910, and in 1912 moved to South Bend, Ind., as industrial engineer for the Northern Indiana Gas and Electric Co. Following this he was actively interested in the operation and management of gas properties in New York, New Hampshire Vermont, Pennsylvania, Georgia and Florida.

Since 1917, Mr. Ramsay has been located in Philadelphia, advising and consulting in the operation of gas properties in the east. He has been an active figure in the national gas industry affairs through his participation on numerous A. G. A. committees.

• •

Nine employees of the Consolidated Edison Co. of New York, Inc., were honored recently for their efforts in life saving. Eight of them received the McCarter medal and certificate, awarded for the resuscitation of persons overcome by gas, and the ninth received the McCarter certificate of assistance.

Top honors went to **Vincent P. Walsh** who was cited for successfully reviving two women and was awarded the McCarter bar, medal and two certificates. Other employees who received the medal and certificate were: **Joseph Batelka, John E. Carroll, John G. Gillard, Walter E. Kuss, Otto K. Spiegel, William G. Wilson,** and **Francis C. Wondrasch,** all of the distribution department. **James Cangro** received a certificate of assistance for his aid in an emergency case.

Award of the McCarter medals is made through a committee of the American Gas Association. **Thomas N. McCarter,** chairman of the board, Public Service Electric & Gas Co., Newark, N. J., is donor of the medals which have been instrumental in focusing attention on accident prevention work in public utilities.

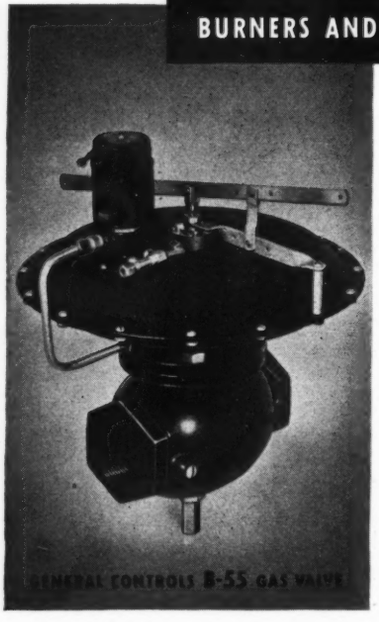
• •

J. K. Swanson, general manager of Franco Public Service Co., and of Northern Natural Gas Co., Ltd., Saskatoon, Sask., Canada, was a leading participant in the ceremony which marked the advent of natural gas in Vermilion Alberta, Canada, recently. Mr. Swanson was formerly vice president and general manager of the Minneapolis Gas Light Co. and a director of the American Gas Association.

• •

Herbert W. Durgy, former new business supervisor for the Dominion Natural Gas Co., Brantford, Ontario, Canada, has been promoted to the position of district superintend-

THE ONE CONTROL THAT MEETS ALL YOUR REQUIREMENTS FOR INDUSTRIAL & COMMERCIAL BURNERS AND FURNACES . . . . .



★ Opening time adjustable, 5 to 60 seconds.
★ Widest range in pressures. Handles up to 5 lbs.
★ Widest range of sizes. Available from ¾" to 6" I.P.S. for manufactured or natural gas.
★ Ample power is available for louvre control. Damper arm easily rotated to any desired position.
★ Low current consumption. In sizes up to 1½" I.P.S., uses but 8 watts.
★ A.G.A. and Factory Mutual approved.
★ Ask For New Bulletin. Write for your copy of the new 12-page gas control bulletin just off the press. Use it as your buyer's guide.

GENERAL CONTROLS
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New York · Boston · Philadelphia · Cleveland · Kansas City
Detroit · Chicago · Atlanta · Dallas · Houston · San Francisco

ent for the same company with offices at St. Catherines. He succeeds **R. Henderson.**

• •

S. L. Stentz has been appointed assistant head of the producing division of the Office of Petroleum Coordinator. Mr. Stentz had been previously associated with the National Tank Co., Tulsa, Okla. He received his civil engineering degree from Carnegie Institute of Technology and spent seven years on operation and construction in steel mills in Pittsburgh. Mr. Stentz was with the A. M. Byers Co. as Mid-Continent representative for six years before joining the National Tank organization.

• •

Sir Frederick J. West, chairman and managing director of West's Gas Improvement Co., Ltd., Manchester, England, was recently elected president of The Institute of Gas Engineers, London. An outstanding leader of the British gas industry, Sir Frederick was awarded the Walton Clark medal in 1935 by The Franklin Institute for his contributions to the industry. He is widely known in the United States, having attended and contributed to several A.G.A. conventions and participated in international gas conferences. He has been a member of the American Gas Association since 1919.

• •

Wallace W. Lockwood has been appointed advertising manager of the Taylor Instrument Co., Rochester, N. Y. Mr. Lockwood replaces **Elmer E. Way,** who resigned. A graduate of Syracuse University, Mr. Lockwood joined the Taylor advertising department in 1932 and was made assistant advertising manager in 1939. He was previously connected with the Lapp Insulator Co., Leroy, N. Y., the Z. L. Potter Advertising Agency and the David Tynion Advertising Agency, both of Syracuse, N. Y.

• •

Howard H. Hollon, former manager of the Kansas-Nebraska Natural Gas Co. in Shelton, Neb., has been promoted to the position of heat engineer with headquarters at Hastings, Neb. In his new capacity, Mr. Hollon will have charge of the sale of heat appliances and the inspection of heat installations in numerous towns in the central Nebraska area. **G. R. Kridler,** formerly of Phillipsburg, Kan., will succeed Mr. Hollon as manager of the company in Shelton.

• •

Winners of the Consolidated Gas Utilities Corp.'s inter-company essay contest were announced as follows: **J. F. Johnson,** Oklahoma City, first award; **James A. Hues,** Weatherford, second award; and **W. A. Alexander,** Thomas, Okla., third award.

• •

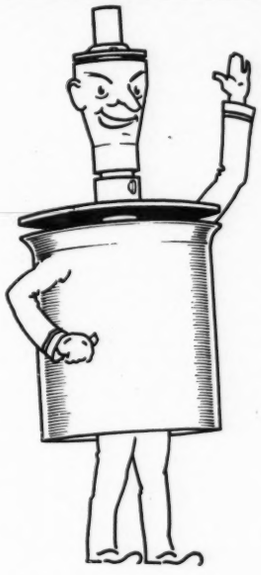
G. L. Taylor, formerly district manager of the Childress, Texas, office of the United Gas Corp., has been promoted to district manager of the New Braunfels office of the company.

• •

Announcement was recently made by the Baxter Springs Gas Co., Baxter Springs, Kan., that the company has added two employees, **Kenneth Cripps** as salesman, and **Mark Hanna** as a member of the service department.

• •

Elmer H. Pehrson has been appointed chief of the economics and statistics branch, Bureau of Mines, U. S. Department of the Interior. He has been acting head since the retirement of **James W. Furness.**



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GOOD BURNERS

SERIES "V" BURNER

Pre-Mix Type — absolutely noiseless — especially good for boiler installations in churches, schools, and apartments.

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Popular Zink Star Type—simple, sturdy, and efficient — especially good for installations in power boilers.

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Refractory Type — especially good for installing in boilers having very low draft and small combustion space.

CONVERSION FURNACE BURNERS

Luminous Flame Type—fits 98% of all domestic furnaces—tested approved, efficient, and economical.

JOHN ZINK FLOOR FURNACES

Made in three sizes—25,000, 50,000, and 68,000 B. t. u./hr.

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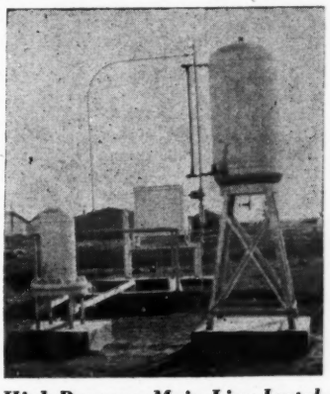

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Accuracy
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Type **M PEERLESS ODORIZER**
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Valuable NEW FEATURES...

...plus all of the time-tested advantages of the previous model—

ANUBIS

Portable

GAS BALANCE

Redesigned and improved both in construction and operation, but the basic principles which have been proved to be correct through years of successful use are unchanged. New, larger front window permits easy reading of both extremes of the scale. Thermometer is mounted **inside,** completely immersed in the gas sample. All metal parts are heavily plated for resistance to corrosion. Instrument is securely mounted on rigid metal base which has a central pilot hole that can be tapped with thread for any type of tripod.

Weighs Only 20 Pounds Complete in Carrying Case

This Anubis Portable Gas Balance is really **portable** and is sturdily constructed to stand up under field use. It is adaptable for use at low pressures or vacuum under actual line conditions.

Send for Bulletin 101

AMERICAN

Recording Chart Co.

3113 East 11th Street
LOS ANGELES, CALIF.
510 South Lansing Avenue
TULSA, OKLA.

Obituaries

Harutyun G. Terzian

Harutyun G. Terzian, 53, gas engineer of United Engineers & Constructors, Inc., and formerly with United Gas Improvement Co., Philadelphia, Pa., died on September 2. Mr. Terzian was recognized as an outstanding authority on the production of carburetted and blue water gas. As a member of the American Gas Association, he took an active part in its technical work. He presented a paper at the 1936 Production and Chemical Conference, as well as at the general A. G. A. Convention of that year, entitled "Method of Determining the Relation of Generator Fuel, Oil and Tar in the Evaluation of Heavy Oil for Carburetted Water Gas." This method, which bears his name, is in general use for controlling the production of carburetted gas.

A native of Turkish Armenia, Mr. Terzian started his career in the gas industry in 1913 in the gas production department of the Syracuse Lighting Co. After a few years he entered the experimental plant of the United Gas Improvement Co. and later became manager of this plant. In 1917 he enlisted in the U. S. Army and engaged in the government program of benzol and toluol production. During the years 1918 to 1921 he assisted in the development of a cracking process for the production of toluol. He continued his work at the U.G.I. Experimental Plant, and in 1926 became a member of the United Engineers & Constructors, Inc. Mr. Terzian was a member of the American Gas Association and the American Society of Mechanical Engineers.

• •

H. L. Dickerson

Harry Lewis Dickerson, executive of the gas utility department of the Electric Bond and Share Co., New York City, and a member of the executive board of the American Gas Association, died August 16 after a long illness. Mr. Dickerson was 58. After working as a construction supervisor from 1909 to 1917, he became assistant general auditor of the Emergency Fleet Corp., the government agency that controlled the construction of freighters.

From 1926 to 1929 Mr. Dickerson was associated with Cities Service Co. in various capacities investigating gas and oil operations. In 1929 he was elected vice president of the United Gas Engineering Co., Houston, Texas, and later became vice president of the United Gas Public Service Co., Houston. Mr. Dickerson joined the Electric Bond and Share Co. in 1931.

• •

John M. Costello

John M. Costello, a director and vice president of the Central New York Power Corp., Syracuse, died recently. He was active in public utilities in central and western New York for 30 years and prominent in the expansion of the Niagara-Hudson system. He has been a member of the American Gas Association since 1930.

• •

Frederick W. Robertshaw

Frederick W. Robertshaw, 88, founder of the Robertshaw Thermostat Co., retired inventor and industrialist, died August 24 in Pittsburgh, Pa. A native of Kentucky, Mr. Robertshaw worked for several brass-making firms where he gained mechanical and technical knowledge which later enabled him to invent the thermostat which was originally applied to water heaters. He invented the thermostat as a labor-saving device for his wife in 1899. In a few years many people in his neighborhood had heard about his invention and expressed wishes for duplicates. He began the manufacture of the invention in 1907.

In 1914 he moved his plant to Youngwood, Pa. Twenty-eight persons were originally employed by his company whose present personnel totals 2300. The company controls and operates the Grayson Heat Control, Ltd., in Lynwood, Calif., and the American Thermometer Co., in St. Louis, Mo. Mr. Robertshaw retired from the presidency of the Robertshaw Thermostat Co. 13 years ago.

• •

Evald Anderson

Evald Anderson, technical director of the Western Precipitation Corp., and one of the outstanding engineers of the country in his chosen field of work, died recently. Mr. Anderson spent his entire business career with the Western Precipitation Corp. following his graduation from the University of California in 1913. In February, 1940, he was presented with a Modern Pioneers Award, sponsored by the National Association of Manufacturers, in recognition of his outstanding accomplishments. Mr. Anderson, a native of Sweden, was a Fellow of the Association for Advancement of Science and member of the American Institute of Chemical Engineers, American Chemical Society, American Physical Society, and Technical Association of Pulp and Paper Industry. He obtained patents on many inventions relative to electrical precipitation, mechanical dust collectors, by-product potash production, and was the author of many technical articles on electrical precipitation and other subjects.

• •

E. Frank Gardiner

E. Frank Gardiner, 54, veteran Chicago newspaper and advertising man who filled two terms as president of the Public Utilities Advertising Association, died September 4 from a heart attack. Mr. Gardiner had been in ill health for the past two years.

Starting his newspaper career in Kankakee, Ill., he later became a reporter for the *Chicago Evening Post* and was subsequently on the editorial staffs of the *Chicago Tribune* and *Chicago Herald*. During the World War he was with the foreign cable service of the United States Committee on Public Information.

For several years after the war Mr. Gardiner was in charge of publicity and advertising for the Midland United Co., and he became advertising manager of the Commonwealth Edison Co. in 1935, resigning in 1939. He was a member of the American Gas Association.

• •

L. M. Edwards

Levi M. Edwards, commercial manager of the Citizens Gas and Coke Utility, Indianapolis, Ind., died recently. He was connected with the company 33 years and was one of the oldest employees in point of service.

• •

Charles H. Roberts

Charles H. Roberts, 51, treasurer of Johns-Manville Corp., New York, N. Y., died September 10 of a heart ailment. Mr. Roberts lived in Scarsdale, N. Y.

Gas Brings Comforts of Home To Army Recreation Camp

SOLDIERS visiting St. Louis, Mo., while on leave from the regular army camps will find complete "home-like" gas service at the recently completed U. S. Army Recreation Camp at Forest Park, Mo.

At Forest Park, gas supplies heat for the 180 tents which have a housing capacity of 1080 men. Gas is used to heat the water for the five bath houses, for cooking and water heating at the recreational pavilion in the center of the camp. Gas radiant circulators are used for the sleeping rooms and the bath houses are heated with unit type circulators suspended from the rafters.

The fuel is supplied to the camp through a 6-in. high-pressure main, connected to The Laclede Gas Light Co. main at Kings highway and Gibson street. Gas for use by the camp proper is measured through three meters of 10,000 cu. ft. capacity per hour, each, while gas for the concessions in the recreation pavilion is measured through a meter of 800 cu. ft. capacity.

The Forest Park camp is in command of Col. Thomas L. Leigh and is one of three camps in the state of Missouri.

■ ■

Information Committee Issues Public Opinion Bulletin

The National Industrial Information Committee, sponsored by the National Association of Manufacturers and headed by J. Howard Pew, chairman of the Committee, and president of the Sun Oil Co., has issued a public opinion bulletin titled, "How to Keep Your Business in Tune with Public Opinion."

The bulletin shows what the public thinks about business problems today. Important groups, such as editors, clergymen and educators are among the members of the N.I.I.C. which furnished some of the material for the compilation of the bulletin. "Prices, Profiteering and the Public" is the topic dealt with at length in the current issue of the bulletin.

■ ■

Natural Gas Demand High In Rio Vista, Calif., Region

The Pacific Gas and Electric Co., San Francisco, has applied to the Railroad Commission of California for permission to substitute Rio Vista natural gas for Kettleman Hills gas in Sacramento, San Joaquin and Stanislaus counties during certain months of the year. Company officials testified that demand for natural gas has increased enormously due to defense needs and the greatest demand came during the period when oil production is the lowest. The company is seeking the right to serve the three interior counties with gas from the Rio Vista fields during the winter months to relieve the heavy draft on San Joaquin Valley fields.

■ ■

Reprints Are Available on Knoy Combustion Article

Reprints are now available on the article titled "Combustion Experiments With Liquefied Petroleum Gases," by Frank Knoy, of the gas department, city of Long Beach, Calif., as printed in *GAS* Magazine, June, 1941, pp. 14-19. Information concerning the reprints may be obtained by addressing correspondence to: Frank Knoy, combustion engineer, Municipal Gas Dept., 307 Municipal Utilities Bldg., Long Beach, Calif.

FACTORY BEND METHOD AS USED ON 26-INCH GAS LINE

Are you considering the building of large diameter gas lines? You will be interested in this method of using factory bends, for our daily engineering report tells you where every bend is and just how much measured slack is in each mile of line. We place our experience at your disposal.

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"CORONADO" GAS FILTERS

(Patents Pending)

Recommended for the removal of dust and gum from gas lines feeding pilots or small, constantly operating main burners.

No. 1 (illustrated) for pilots of ranges, water heaters, etc. Capacity ¾ cu. ft. per hour.

No. 2. For complete gas supply to refrigerators, small water heaters, house heating appliance pilots, etc. Capacity 10 cu. ft. per hour.

THE W. J. SCHOENBERGER COMPANY

CLEVELAND, OHIO

New Los Angeles offices of the Merco Nordstrom Valve Co. and Pitsburgh Equitable Meter Co. occupy approximately 25,000 sq. ft. of space and are located at 3136 East 11th street. These enlarged quarters represent the fifth Los Angeles expansion.

Merco Nordstrom Expands in L. A.

REFLECTING the fifth Los Angeles expansion in recent years, Merco Nordstrom Valve Co. and Pittsburgh Equitable Meter Co. have moved to new quarters. Greatly expanded facilities are represented in the new location at 3136 E. Eleventh street, according to H. Boezinger, vice president in charge of west coast sales.

The companies' new location occupies approximately 25,000 sq. ft. of space. A modern, streamlined building has been erected with spur track for shipments from the factories direct to the warehouse.

An air-conditioned, temperature-controlled proving department has been included to scientifically and accurately check gas meters. Modern facilities are installed for repairing valves, water meters, orifice meters and oil and gasoline meters. Complete facilities have been established for giving factory service. A Simplex intercommunicating system has been installed for direct access to the firms' various factories and warehouses throughout the country. Larger stocks are to be carried to permit prompt delivery of emergency orders.

■ ■

Company Would Use 8-in. Line to Serve Galesville, Ill.

THE PANHANDLE Eastern Pipe Line Co., Kansas City, Mo., has filed application to the Federal Power Commission seeking authorization to reclaim and transfer to the Illinois Natural Gas Co., a wholly owned subsidiary, an 8-in. pipe line extending from the applicant's main transmission line which was formerly used in serving Mildred and Kincaid, Kan.

Approval of the application would enable Illinois Natural Gas Co. to utilize the pipe to construct a line from its existing pipe line to the corporate limits of Galesburg, Ill., to fulfill an agreement with Illinois-Iowa Power Co., distributing company in Galesburg, for the sale of natural gas in that city. The 8-in. line was originally constructed to serve a cement plant which was removed and no person, firm or corporation is now receiving natural gas from the line. Gas is being furnished to Mildred and Kincaid from the lines of the Commercial Gas Pipe Line Co.

Illinois-Iowa Power Co. at present distributes manufactured gas in Galesburg and in the early part of 1941 entered into an agreement with Illinois Natural for the construction by the latter of an 8-in. pipe line to the Galesburg city limits, upon completion of which Illinois-Iowa would convert its distributing plant in Galesburg to the use of straight natural gas purchased from Illinois Natural. Because of the heavy demand on the steel industry and priorities granted for the supply of 8-in. pipe, the Illinois Natural Gas Co. has been unable to obtain the pipe.

■ ■

Toluene Plant to Be Built By Shell Oil Co. in Illinois

According to E. D. Cumming, vice president of the Shell Oil Co., Inc., contracts have been let for the construction of a large toluene plant at the company's Wood River, Ill., refinery. Planned to produce 4,000,000 gals. of toluene annually, this will be the third such plant erected by the Shell Co. One of the plants, located at Houston, went into production last December and the other, also in Houston, is expected to begin operations in October. Upon completion of the Wood River plant, the company's output of toluene will be 8,000,000 gals. per year, from which more than 80,000,000 pounds of T.N.T. can be manufactured.

The new plant, on which construction is to start immediately, will be completed early next year. The building contract has been awarded to the C. F. Braun Co. and the Fluor Corp., both of Alhambra, Calif. The three toluene plants represent an investment of more than $3,000,000.

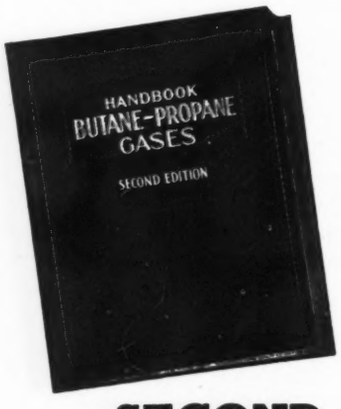
■ ■

Arkansas-Louisiana Gas Co. To Build Connecting Line

Right-of-way deeds for eight miles of 16 and 10-in. gas pipe lines to be constructed by the Arkansas-Louisiana Gas Co., at an estimated cost of $125,000, have been filed in Pulaski County, Ark.

Construction will start on the line as soon as the material is received in Little Rock, according to R. W. Curran, Arkansas division manager of the gas company. Two-thirds of the line will be 16-in. pipe and one-third, 10-in.

HANDBOOK BUTANE-PROPANE GASES



415 Pages

CONTENTS: Semi-Bulk Distribution: Use of Butane in Buses: Combination Propane Operated Utility Plant: Use in Internal Combustion Engines: Design and Installation of Storage: Supply from Petroleum Refineries: Engineering Data on the Lower Olefins: Domestic Appliance Testing and Utilization: Economical Comparisons with Coal, Oil, Electricty, Producer Gas, Manufactured Gas: Town Plants: Manufacture from Natural Gas: Special Uses: Volume Correction Factors: Transportation: Use with Other Gases: Analysis and Testing: Properties of Mixtures: Bottled Gas Distribution: Bibliography: Central Plant Directory: Catalog Section.

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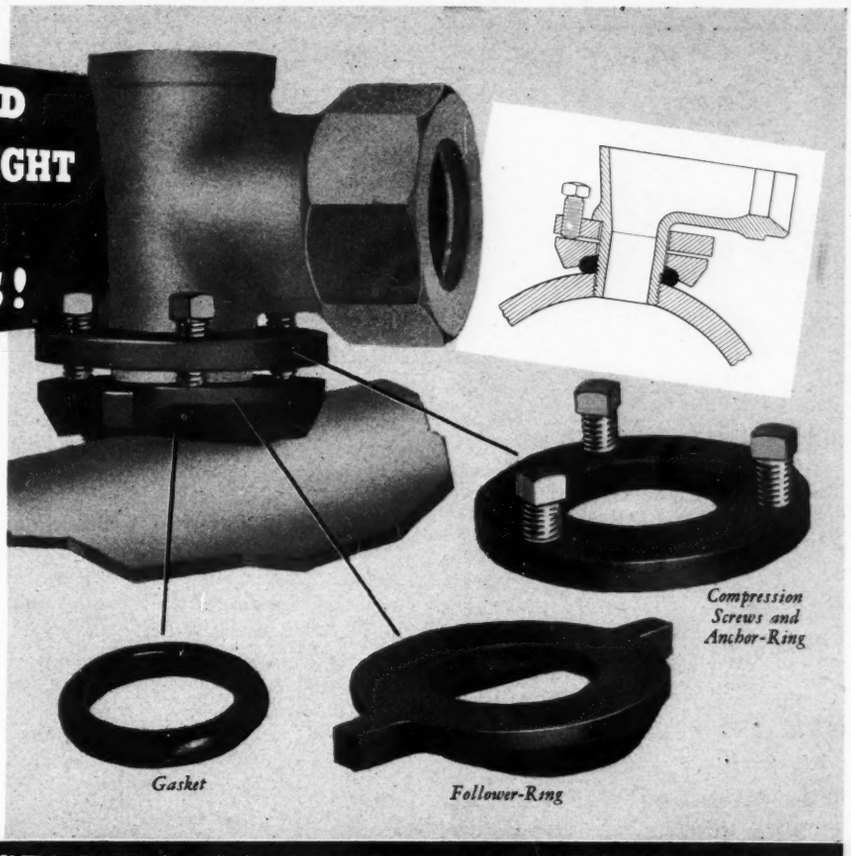
Designed to provide a gas-tight connection and protect threads against corrosion, the Dresser Service Seal, Style 81, is used to seal threaded service fittings on:

1. steel mains where it is impossible to obtain sufficient threads to make a gas-tight connection; eliminates welding on a screw collar or using a saddle.
2. cast-iron mains to avoid wedging action of tapered threads being screwed tightly.

Because fitting needs to be screwed in the main only hand-tight, it is possible to turn fitting to "look" in any desired direction. The Dresser Service Seal is also useful in sealing off fitting used with an old tap which may be over-size.

When ordering Dresser Service Seals give tap sizes and diameter of main. Further information on request.



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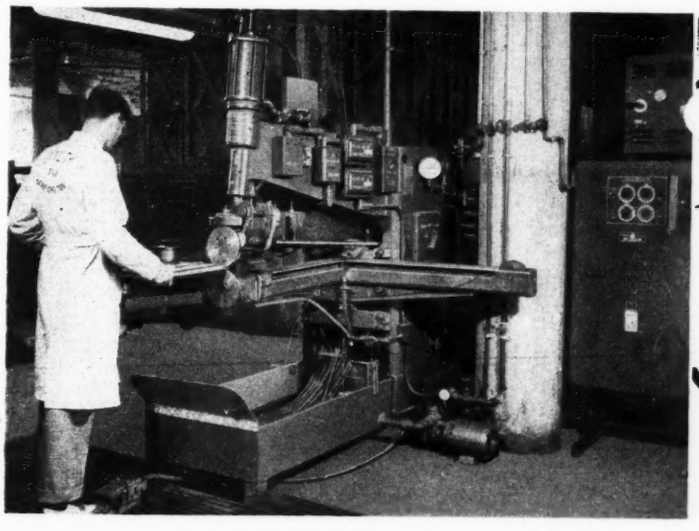

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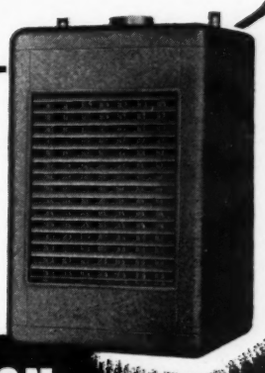

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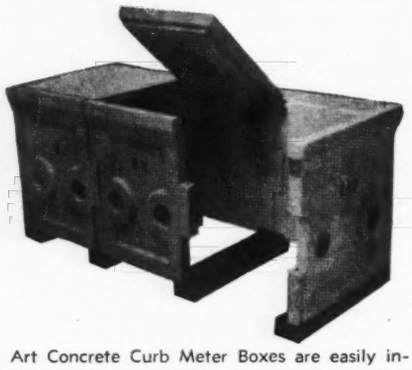

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Approval Requirements Distributed

FOUR sets of approval requirements were recently prepared and distributed to utility companies and interested manufacturers for comment and criticism. These include revisions to existing requirements for central heating appliances, gas ranges and space heaters, and proposed requirements for gas-fired duct furnaces.

Required thickness for heat exchangers of warm air furnaces is increased from No. 22 to No. 20 U.S. Standard gauge. A new requirement specifies a minimum heating element temperature of 178° within a given time to insure against occurrence of condensation and resulting corrosion. Maximum external surface temperature of heating elements is limited to 875° F. A maximum differential of 0.4% CO^2 in the flue gases from both boilers and furnaces with control compartment doors in place and removed is allowed.

Revised range standards include detailed requirements for automatic electric pilot igniters. Accessories and fittings must be accessible from the front of the range to facilitate servicing. Combustion tests are strengthened by reducing the time before oven samples are taken after a cold start from 15 minutes to 5 minutes. A change in the oven heat distribution test calls for baking of four layer cakes simultaneously. All cakes must be evenly browned, within definite limits as determined by a photo-electric reflectometer. Three new sections are added to the space heater requirements besides many minor changes. Valve handle temperatures must not exceed a rise of 40° F. above room temperature.

Suggestions and criticisms from the industry should be submitted before Nov. 1. Letters should be addressed to C. H. Waring, chairman, A.S.A. sectional committee, project Z21, A.G.A. Approval Requirements Committee, located at 1032 East 62nd street, Cleveland, Ohio.

Hurricane Fails to Disrupt Gas Service

NATURAL GAS service in Houston, Texas, was uninterrupted by a tropical hurricane which lashed the city on the night of September 23, causing millions of dollars worth of damage and disrupting electric, telephone and water service.

The storm suddenly reversed its course and struck Houston without warning, after a weather bureau advisory had stated the city was "out of danger." When, sometime after midnight, the blow passed on to the North, it left six dead and many injured. Live wires and broken windows were on every hand. Automobiles were stalled in the street floods caused by torrential rains—but United Gas service was able to do business as usual.

No small amount of the damage incurred by downtown Houston was evident in the company's sales floor where the wind smashed several large plate glass windows and accounted for nearly $4000 worth of damage.

"Our natural gas service came through the emergency with flying colors," said K. L. Simons, vice president of United Gas Corp., and Houston Division manager. "The only interruption occurred where houses were blown down or falling trees disconnected our lines. All such cases were quickly cared for, and the company suffered no important loss of load."

The wind velocity of the storm at its peak was estimated at from 65 to 77 miles an hour, some of the weather bureau recording instruments having been so damaged by the wind as to be unreliable.

■ ■

Recently Formed Company Completes 146-Mile Line

The Kansas-Nebraska Natural Gas Co., Phillipsburg, Kan., which represents the consolidation of the Kansas Pipe Line and Gas Co., Phillipsburg, Kan., and the Nebraska Natural Gas Co., Topeka, Kan., has announced the completion of a 146-mile pipe line from Scott City, Kan. to Cambridge, Neb., according to Thomas Creigh, Jr. of the company.

The 8-in. line has an operating pressure of 600 lbs. Maximum capacity of the line is 20,000,000 cu. ft. and present operating capacity is 7,500,000 cu. ft. Communities to be served natural gas by the line include Oakley, Colby, Gem, Atwood, Herndon, McDonald and Bird City, Kan. The 900 h. p. compressor station for the line is located at Scott City, Kan.

■ ■

Dresser Mfg. Co. Has New Warehouse at Houston

The Dresser Manufacturing Co., of Bradford, Pa., has opened a new warehouse at 1121 Rothwell St., Houston, Texas, to serve the Southwest. David H. Geiser is manager of the new district office. C. T. Davis is district manager of the gas and water division and H. R. Shidel is district manager of the oil field division.

Gas Speeds Rivet Driving In Canadian Shipbuilding

SPECIALLY designed gas furnaces are now being installed at shipyards in Vancouver, Victoria and other parts of British Columbia to speed up the wartime production of naval vessels and merchant shipping, to aid in Canada's war effort. There are 190,000 rivets in each of the corvettes now being turned out by one of the shipyards at a West Coast port. Each move that can be made to speed the heating and driving of these rivets is a direct help in the war effort, and this has been achieved by replacement of the old method of heating rivets with modern gas furnaces in which coke is used. The furnace was specially designed by a gas technician on the staff of the B. C. Electric Power & Gas Co., Vancouver, and 17 of the furnaces were at once installed in one shipyard. Now similar units are being installed in other Pacific coast yards in large quantity.

The 2-in. rivets which hold the steel of the ships together must be properly heated if they are to drive straight and clean. Uniform gas flame, it has been found, ensures best heating results, and not only speeds up construction, but also speeds up training of good riveters, making it possible to train a good rivet heater in three days, whereas formerly the acquiring of the perfect knack of rivet heating required months.

Down both sides of the marine slipway run two pipes, one for air and the other for gas. Every 60 feet the gas line blossoms into a 10 jetted pipe from which heavy rubber hoses snake in every direction to an individual gas rivet heater. The heaters are made in the gas department workshops of the British Columbia Electric Railway Co. and are light enough for two men to carry without effort. The 17 units installed in the first shipyard each serve a crew of four and each of these 14 four-man squads drives 500 rivets a day.

■ ■

Pacific Gas and Electric Co. Is Declared Intrastate

The Securities and Exchange Commission on September 10th, declared that the Pacific Gas and Electric Co., San Francisco, and subsidiaries, an $800,000 000 utility system, was predominantly intrastate and therefore exempt from regulations as a holding company.

The commission ruled, however, the company is subject to a controlling influence by the North American Co. and thus subject to the obligations and liabilities imposed by the act upon subsidiary companies of holding companies.

The Pacific Gas and Electric Co. has filed a petition with the U. S. Circuit Court of Appeals for a review of the Commission's decision, and asked for a stay of the SEC order until a hearing can be held before the court.

■ ■

Terre Haute Gas Corp. to Buy Indiana Gas Utility Co.

Purchase of the Indiana Gas Utility Co., a distributing company which serves Terre Haute and Brazil, Ind., by the recently formed Terre Haute Gas Corp., has been authorized by the Indiana Public Service Commission.

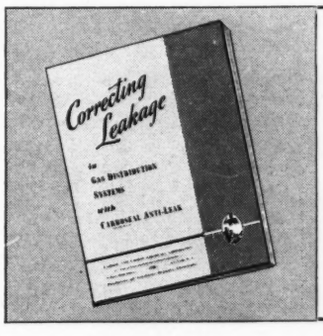
The order authorized the purchase at a price of $1,250,000 and the issuing of first mortgage sinking fund bonds totaling $750,000. The commission also denied the right to intervene in its ruling on a petition of the Kentucky Natural Gas Corp., which has a natural gas line running through Terre Haute and serving Illinois cities and towns. Alfred M. Ogle is president of both companies.

"Carboseal" Anti-Leak Treatment

. . . the economical way to correct Leakage in Dry Bell-and-Spigot Joints

MORE than 265 gas properties are now using "Carboseal" anti-leak treatment in systems distributing dry gas . . . because it effectively corrects bell-and-spigot joint leakage for an indefinite length of time . . . and because it costs surprisingly little. Joints treated eight years ago are still tight today on the soap test. Average cost per joint, taken from the records of 16 users who treated over 200 miles of main, was 50 cents . . . One company buys "Carboseal" anti-leak in tank cars. Another buys regularly in car-load lots. Many companies have made "Carboseal" anti-leak treatment a standard maintenance procedure.

Over three years ago, the lower half of this one-inch rope was treated by immersing the end in "Carboseal" anti-leak until the liquid had climbed to the wire that binds the middle. The rope has been carried about exposed to the air ever since and was photographed in March, 1941. The marked swelling took place immediately after the rope was treated and illustrates the long-term effect of "Carboseal" anti-leak on the packing fibers of bell-and-spigot joints.



You, too, can benefit

"Carboseal" anti-leak treatment can do for you what it has already done for others in reducing unaccounted-for gas loss. Plan now to start using this effective, low-cost method to correct the leakage in the dry bell-and-spigot joints of *your* system . . . This 20-page book tells more about "Carboseal" anti-leak treatment—how to apply it by either the gravity or the hose method, how much it costs, and what results can be obtained. Write for a copy.

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CURRENT Reading

Technical

A New Laboratory Fractionating Column Head—By Tzeng-Jieuq Suen. *Industrial and Engineering Chemistry*, Anal. Ed., Aug. 15, 1941, p. 519. In constructing and using a laboratory fractionating column for analytical purposes, a good column head is just as important as the column itself, if not more so. A relatively simple column head has recently been built by the author and is shown in a figure.

The Resistance of Anthracite to Mechanical and Thermal Shock—By C. C. Wright, L. L. Newman and A. W. Gauger of the School of Mineral Industries of Pennsylvania State College. This 28-page bulletin presents a report of some of the results obtained in the research program on anthracite sponsored jointly by the Commonwealth of Pennsylvania and the Anthracite Institute and carried out in Pennsylvania's School of Mineral Industries and Experimental Station under the supervision of the State Department of Mines. The anthracite program consists of two projects. One of these relates to the study of the use of large sizes of anthracite for the generation of water gas. The second is concerned with the manufacture of active carbon from anthracite. This bulletin, No. 31, may be obtained from The Pennsylvania State College at a cost of 50c per copy.

Causes of Corrosive Currents—By R. B. Mears and R. H. Brown. *Industrial and Engineering Chemistry*, Aug., 1941, pp. 1001-1010. Localized attack of metal specimens is often the result of electrochemical corrosion, not of simple chemical solution. The appearance of specimens suffering this type of attack has led laymen to attribute it to the presence of impurities in the corroding metal. However, impurities are only one possible cause for this type of attack. Other known or possible causes are: (1) grain boundaries, (2) orientation of grains, (3) differential grain size, (4) differential thermal treatment, (5) surface roughness, (6) local scratches or abrasions; (7) difference in shape, (8) differential strain, (9) differential pre-exposure to air or oxygen, (10) differential concentration or composition of the corrosing solution, (11) differential aeration, (12) differential heating, (13) differential illumination, (14) differential agitation, (15) contact with dissimilar metals, (16) externally applied potentials, and (17) complex cells.

Gas Volume Determined with Portable Measuring Device—By H. F. Simons. *Oil and Gas Journal*, Aug. 28, 1941, pp. 50, 54. To facilitate the taking of volume and pressure tests at a small repressuring operation in the Glenn Pool of Oklahoma, a special tester was built. This includes the orifice, manometer and spring gauge, mounted so that readings can be taken in less than 2 minutes. Described and illustrated.

Computing Gas Flow in Pipe Lines—By P. McDonald Biddison. *Petroleum Engineer*, Aug., 1941, pp. 50-54. Correlation of the various methods of solving gas flow problems; Use of the friction factor.

Bituminous Coatings—By A. O. Beckman, R. M. Badger, E. E. Gullekson, and D. P. Stevenson. *Industrial and Engineering Chemistry*, Aug., 1941, pp. 984-990. Possible mechanisms causing corrosion of metals underneath bituminous membranes have been studied. Electroosmosis, diffusion of water, diffusion of electrolytes, and intrusion of water through small holes or fissures in the membrane were studied experimentally. It was found that electroosmosis and ionic diffusion are very small and that diffusion of water is not sufficiently large to account for the amount of rusting frequently encountered in commercial experience. From surface tension and wetting angle measurements of the bituminous membrane-aqueous solution interface, it is shown that a pin-hole imperfection of 0.1 mm. radius will permit penetration of water to a depth of several centimeters in some bituminous membranes.

Survey of Odorizing Practice in Gas Transmission—By R. W. Parker. *Petroleum Engineer*, Midyear, 1941, pp. 114-120. A review of the many informative articles written as odorization developed is indicative of the rapid progress made since engineering principles were first applied. It is apparent from recent surveys that those companies who now odorize are endeavoring to further perfect their equipment and methods and those not odorizing are becoming more and more interested as the scope and results are brought to their attention.

Accurate Voltage Control is Feature of New Holiday Detector—By D. E. Stearns. *Petroleum Engineer*, Midyear, 1941, pp. 160-164. Operating data disclose low voltage just as effective as high for detecting voids in pipe line coatings. Describes and illustrates the new instrument designed by the author.

A Rational Approach to Cathodic Protection Problems—By G. N. Scott. *Petroleum Engineer*, July, 1941, pp. 74-76. Part 3 and last.

Fundamental Physical Relationships of Natural Gas Constituents—By R. W. Machen. *Petroleum Engineer*, Midyear, 1941, pp. 185-189. A review of the tie-in of molecular weights, volume percentages, etc.

Density of Natural Gases — By M. B. Standing and D. L. Katz. *Petroleum Technology*, July, 1941, 10 pages. Density data are reported on 16 saturated hydrocarbon vapors at pressures ranging from 1000 to 8220 lbs. per sq. in. and at temperatures ranging from

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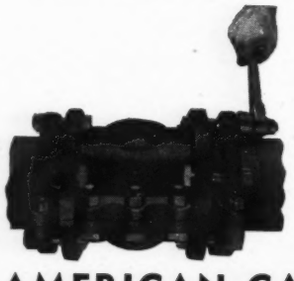

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35° to 250° F. These data have been used to extend the compressibility factor chart for natural gases up to 10,000 lbs. per sq. in. The relatively large quantity of high-boiling constituents present in high-pressure vapors in equilibrium with crude oils makes it necessary to include in the analysis of the gas the molecular weight, density, and possibly boiling range of the heptanes and heavier fraction. Relationships have been presented by which the density of gases may be obtained directly from the temperature, pressure, and gas gravity provided the gases have a common source or are similar in composition.

Plastics and Chemicals From Petroleum Bases—By R. L. Wakeman. *National Petroleum News*, July 23, 1941, pp. R-226, etc. Five principal ways for the synthesis of petroleum and natural gas constituents into plastics and chemical products are described; data is also given on the extent of commercial output of some of these products.

Stress-Relieving Welded Pressure Vessels in the Field—By E. S. Robb. *Refiner*, July, 1941, pp. 251-257. Due to operating conditions, extensive welding repairs, or additional heavy welding occasioned by the installations of new nozzles, manways or reinforcing pads, it may be necessary or at least desirable to stress-relieve a part or the complete welded vessel. It has been found practical and much more economical to do the work in the field rather than to dismantle the unit and send the vessel back to the manufacturer. An outline of the equipment and methods used together with the results obtained is discussed in this article.

City Gas—The Ideal Smokeless Fuel for Domestic and Industrial Uses—By F. E. Vandaveer. *Industrial and Engineering Chemistry*, July, 1941, pp. 852-857. A brief review of the magnitude of the smoke problem in urban communities nationally, as well as its causes and economic and health aspects, is given. Energy requirements for residential, commercial, and industrial heating purposes are evaluated, and the proportion of such total requirements supplied by various types of fuels is estimated. The economic possibilities of supplying all energy requirements with clean, refined fuels are discussed. Cleanliness of production, manufacture, distribution, and utilization, manufacture, distribu- Specific data are presented on chemical properties of commercial gaseous fuels and their combustion products under typical industrial and residential utilization conditions. Mechanics of gaseous fuel combustion are briefly treated. Comparative economies of residential heating with various types of fuels are indicated. Similar treatment is given to industrial heating processes, with form value of different types of fuel receiving particular emphasis. Special reference is made to the part gas has taken in the smoke abatement problem in the St. Louis metropolitan area.

Analysis of Lifting Performance in Natural Flowing Wells—By S. F. Shaw. *Oil Weekly*, Aug. 18, 1941, pp. 21, etc. Air lift operation in water wells; Lifting oil with hydrocarbon gases; Factors that affect lifting operations; Significant rates of flow; Testing for rate of flow; Controlling rates of flow; Graphical representation of tests; Graphs for capacity of eductors or artificial gas lift.

Hints On Burning Natural Gas—By R. H. Godeke. *Power*, Aug., 1941, pp. 78-80. Tests at Tuco Station of Texas-New Mexico Utilities indicate better results from increased excess air. Natural gas requires firing technique different from oil or coal.

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President, Peerless Manufacturing Corporation, Louisville, Kentucky.

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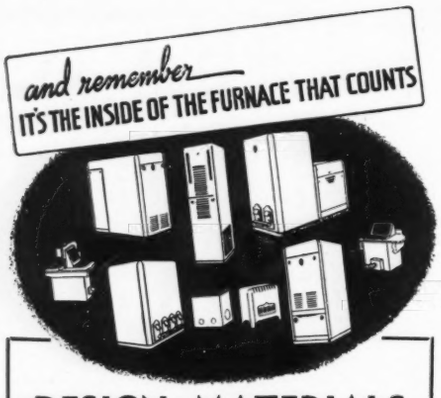

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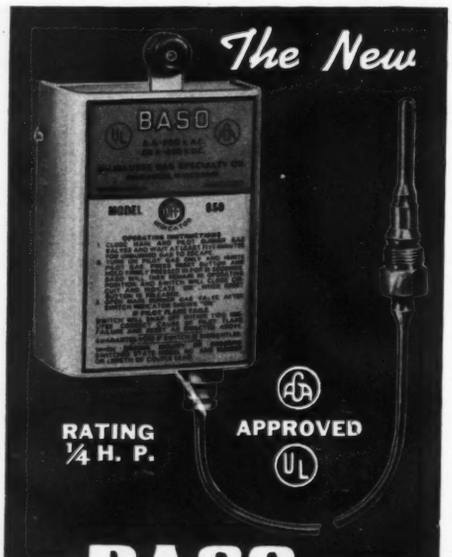

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Improved Gas Valve

General Controls Co., Glendale, Calif.

Model: B-60 Gas Valve.

Description: Valve was introduced three seasons ago to provide automatic gas heating for floor furnaces, gas furnaces, boilers and industrial application, without the use of outside electric current. Four new improvements in design have been added: First, the cover of the valve has been made more compact and tamper-proof; second, its integral pilot valve assembly has been simplified and eliminates external gas ways—it has a rigid vent connection; third, new valve bodies are made stronger by use of hi-tensile iron—seating pressures have been increased; fourth, binding posts are securely locked in casting to prevent turning—terminal connections may be made secure with crescent wrench or screwdriver.

Available in sizes from ⅜ in. to 1½ in. I. P. S. for use with natural, manufactured and liquefied petroleum gas.

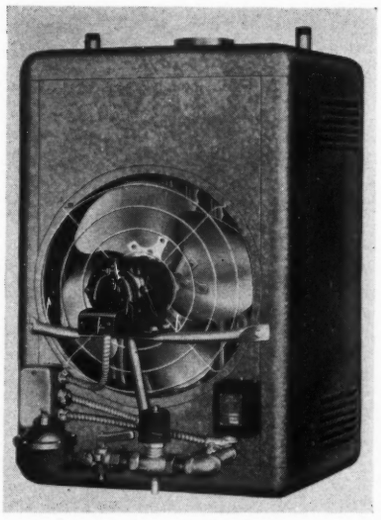
■ ■

Micro-Action Valve

J. A. Campbell Co., Long Beach, Calif.

Model: Campbell Micro-Bean.

Description: For dampening the pulsation of boiler and plant pump governors and to eliminate "jitters" of the gage hand. It can be installed on the pressure line to the diaphragm of a pump governor for protection of the pressure gage mechanism and tube, also the spring, diaphragm and stem packing. The valve will handle steam, fuel oil, gas, water or other liquids, with simple adjustment for each viscosity. The Micro-Bean consists of a solid brass body in which a filter is inserted for protection from foreign matter. The valve has an extremely slight taper so that very sensitive control of the shut-off is effected. The micrometric control of the opening enables the operator to obtain the closest approach to full shut-off down to the last .0003 of an inch, regardless of the line content. A 48-to-1 taper of the valve minimizes the effect of stem and screw compression strain. The device is universal in application for varied purposes up to 3000 lbs. pressure and will give any degree of stabilization desired by merely turning the valve. Any scoring which might eventually take place, (it is microscopic) can be ground out by shutting off the valve two or three times.



Gas-Fired Heater

Utility Fan Corp., Los Angeles, Calif.

Description: The heating element in this unit heater has corrugated sections shown by test to give maximum heat transfer for space occupied. Highly streamlined design and installation close to the ceiling are gained by use of built-in draft diverter, as well as compact arrangement of the motor and fan assembly in the intake air chamber. Uniform air distribution over the entire heat transfer surface is obtained by the design of the air chamber and the silent disc type of fan used. The cabinet is dieformed, all welded steel construction, with directional grills. The finish is hammered baked enamel with a semi-gloss finish. Controls include temperature limit switch and thermocouple type safety pilot. Thermostat controls are optional equipment, and where not specified, manual control from a toggle switch is used. Separate burners for each section of the heating element prevent excessive firebox temperatures and increase efficiency.

■ ■

Low Voltage Thermostat

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Model: Type T81 Acratherm Thermostat.

Description: A new low voltage room thermostat for use in controlling low voltage two-wire type valves and motors. It is similar in design and appearance to the Series 10 Acratherm except that S.P.S.T. snap action contacts are used to permit control of two-wire devices. Accurate control is assured through the use of an artificial heater and an unusually sensitive bi-metal actuating element. The differential is adjustable and contacts are of ample capacity for low voltage loads.

The Acratherm has a silver finish and is furnished with a detachable mounting plate to facilitate installation. It may be equipped with a locking cover to guard against tampering and a positive night cutoff to prevent any operation of the heating plant during the night at no extra cost. Standard range is 54° to 86° F.

Catalogs

• The Worthington Pump and Machinery Corp., Harrison, N. J., has issued a new catalog on rotary pumps with double-helical gears. The types of rotary pumps with double-helical gears manufactured by the company are listed, features of the pumps are explained and applications of the pumps to different industries are enumerated. Speed, size, displacement, and maximum pressure of the different Worthington pumps is given in chart form. On the last two pages of the catalog is a viscosity conversion table, a chart on the increase in volume of petroleum oils with increase in temperature, and a chart on the relation of A. P. I. hydrometer scale to specific gravity. The catalog, known as W1483-B1, may be had at no cost.

• The Hays Corp., Michigan City. Ind., has issued a booklet titled "Draft-What, Where, How, Why," which was written by W. H. Pugsley, manager of engineering for the company. The booklet is divided into four parts. Part one deals with what draft is, how draft is measured, what the draft gage tells and selecting the draft gage to suit the requirements. Part two tells where to measure draft and pressure in a modern steam plant. Part three explains where to connect draft gages on various types of fuel feed and part four tells how to install draft gages. The 20-page booklet contains numerous charts and diagrams.

• H. A. Thrush & Co., Peru, Ind., has issued a folder featuring heating specialties for gas-fired systems. The folder describes the Thrush forced circulating hot water heating plant and heating specialties for gas-fired systems made by the company. These specialties include water circulators, flow control valves, pressure reducing valves, differential pressure relief valves, air tight pressure tanks, high pressure or temperature relief valves, radiant heat controls, and modulating water temperature controls. The folder is available upon request.

• Blaw-Knox Co., Pittsburgh, Pa., has issued a new bulletin, No. 1830, on equipment and plants for the process industries. There is a review of the company's scope and facilities in this field, but the booklet is primarily devoted to descriptions and illustrations of recently developed items of chemical-process equipment. Blaw-Knox handling and unloading plants for liquefied gases are described, and attention is drawn to the facilities of the company for the manufacture of high pressure-high temperature piping.

• The Selas Co., Philadelphia, Pa., has issued a new booklet on "Improved Processing." Major portion of the 14-page publication is taken up with the section titled, "A Case History In Ceramics Involving An Idea For All Heat-Using Industries."

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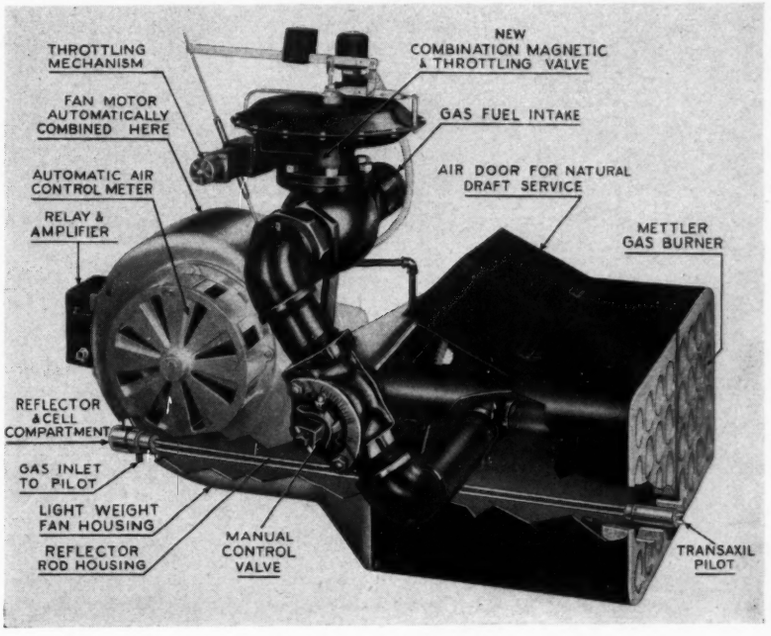

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NATIONWIDE SALES AND STOCKS

Natural Gas Demand Up 15% in 1941

AT THE present time consumption of natural gas is exceeding demand in the comparable months of 1940 by approximately 15%. This conclusion is reported in natural gas statistics for June, released recently by the American Gas Association. The six months' record does not compare as favorably with current consumption, largely because of the relatively mild weather during the first quarter of this year in contrast to 1940 conditions.

Consumption of natural gas was 3.3% higher during the first half of this year than for the first six months of 1940. The higher average consumption held at approximately 15% during the last two months of the first half year.

Most of the increased consumption of natural gas is created by industrial activity, statistics show. For example, the industrial consumption in June, 1941, accounted for 56% of the total natural gas sales compared to 54% a year ago. Industrial consumption increased 20.7% last June over a year ago and for the first six months this class of demand was up 15.9%. Gas consumed in electric generation was 16.2% higher in June than a year ago and for the six months 9.2% over 1940.

Domestic customers served by natural gas utility companies, including house heating, totaled 7,252,000 at the end of June which is a gain of 4.4% over the same month a year ago.

So. Calif. Gas Co. Expands Pipe System

SOUTHERN California Gas Co., Los Angeles, Calif., Oct. 2, announced awarding of a contract to Macco-Robertson, Inc. for the construction of 16 miles of 18-in. pipe line from the foothills of the Tehachapi mountains, 30 miles south of Bakersfield, to the junction of the transmission line from the Rio Bravo, Ten Sections and Paloma fields.

Cost of the project for all labor and materials will approximate $400,000. The pipe line is scheduled for completion prior to November 15.

This pipe line will reinforce the pipe line capacity from the junction of the lines from the main compressor station and from the fields noted above to the foot of the Tehachapi mountains. Here the 18-in. line will connect with a 22-in. line which continues on over the mountains and into the Los Angeles metropolitan area.

Construction has been undertaken at this time to prepare for anticipated heavy winter demands for gas. With the large number of defense industries in the Los Angeles district and increasing customers, greater demands than at any previous period in the company's history are anticipated. This line will increase the transmission capacity from the San Joaquin Valley gas and oil fields by about 20,000,000 cu. ft. daily. It is the first large addition to the company's major transmission system since 1937.

A total of 2005 tons of pipe will be required, which is now strung along the right-of-way preparatory to construction procedure.

■ ■

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The Fluor Corp., Ltd., to Enlarge Los Angeles Plant

A 40-ft addition to the office building to provide 1600 sq. ft. of new space for the cooling tower and accounting departments is being constructed at the Los Angeles plant of The Fluor Corp., Ltd. To the existing 20 - 000 sq. ft. of factory space, now being used for prefabricating the corporation's aerator type atmospheric and mechanical draft cooling towers, a mill addition 80 ft. by 120 ft. is being built to provide 10,000 sq. ft. of new floor space.

The Fluor Corp., Ltd., moved into its present plant, designed for 50% expansion, a year ago. Two months later it was found necessary to add 2400 sq. ft. to the east wing of the office building in order to double the capacity of the drafting room.